Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

WEDRON SILICA CO.

Increases Capacity–Reduces Power & Maintenance

Three pulsometers and a drag conveyor have been replaced by two 6" Hydroseal Sand Pumps in series at the Wedron Silica Co., Wedron, Illinois. In this pioneering installation of pumps, the silica sand is pumped 1600 feet and against an elevation of 105 feet from the sump at the pump house, to the wash house on top of the hill. The plant capacity has been increased 16% per day due to the maintained, uniform capacity and discharge head of the Hydroseal Pumps. The low power consumption resulting from the unique Hydroseal Principle permits them to save $2.00 per hour under their former pumping costs. Maximix Rubber Pumping Parts (Impeller — Shell Liner — Side Plate Liners, etc.) have introduced decided savings in maintenance costs, and due to their longer service life, replacements are less frequently necessary... Address the nearest office listed at the right for a copy of our catalog No. 836 or any other information.

HYDROSEAL *Sand* PUMPS

ASH

HYDROSEAL AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD AND CAN BE PURCHASED ONLY THROUGH THE FOLLOWING COMPANIES

•

PHILADELPHIA
MAIN OFFICE
The Allen-Sherman-Hoff Co.
221 So. 15th Street

ATLANTA
Boiler Equipment Service Co.
586 Greenwood Ave., N.E.

BOSTON
F. D. Rogers
89 Broad Street

CHICAGO
The Allen-Sherman-Hoff Co.
407 So. Dearborn Street

CLEVELAND
H. F. Bauer
304 Chester Twelfth Bldg.

DENVER
Shubart & Schloss
520 Boston Bldg.

DETROIT
Coon DeVisser Company
2051 West Lafayette Blvd.

MULBERRY, FLA.
Mulberry Supply Company

NEW ORLEANS
Walter Cooke
846 Baronne Street

NEW YORK
Simler & Sengstaken, Inc.
271 Madison Avenue

PITTSBURGH
Dravo-Doyle Company
Dravo Bldg.

SALT LAKE CITY
The National Equipment Co.
101 West Second South Street

SAN FRANCISCO
The Merrill Company
343 Sansome Street

ST. PAUL
Borchert-Ingersoll, Inc.
2375 University Avenue

ST. LOUIS
Rhodes Equipment Company
Field Bldg.

WILKES-BARRE
Power Engineering Corp.
517 Brooks Bldg.

•

CANADA
Allen-Sherman-Hoff, Ltd.
602 Colonial Building
11 King Street, West, Toronto

ENGLAND
The Ash Co. (London), Ltd.
79/80 Petty France
Westminster, S.W. 1, London

PHILIPPINES
Atkins-Kroll & Company
Insular Life Bldg., Manila

AUSTRALIA
Crossle & Duff, Pty., Ltd.
360 Collins Street, Melbourne

SOUTH AFRICA
The Denver Machinery Co.
206-8 Commissioner Street
Johannesburg, Union of S.A.

Rock Products

With which has been consolidated the journals

CEMENT and ENGINEERING NEWS CONCRETE PRODUCTS

Founded 1896 Est. 1918

RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

Contents

APRIL, 1938

▼ ▼ ▼

DEPARTMENTS

Entered as second-class matter, Jan. 30, 1936 at the Chicago, Ill., postoffice, under the Act of March 3, 1879. Copyrighted, 1938, by Tradepress Publishing Corporation (PUBLISHED MONTHLY)

You Don't Have to Take Chances

Breakdowns during the peak of seasonal production may be extremely costly—disrupting delivery schedules—and even endangering life itself. You can't afford to take a chance on unknown quality. Guard against trouble by using Ryerson Certified Steels—steels that you can depend upon. They cost no more—and you are assured the highest quality obtainable in each type of steel.

Many Ryerson steels are particularly adapted to requirements of the Rock Products Industries. Ryerson Abrasion Resisting Sheets and Plates last many times longer than ordinary steel, yet are moderate in price. Ryerson stocks also include Perforated Sheets and Plates, Special Alloy and Tool Steels, and practically everything in the steel and allied lines.

When you need steel for any purpose—play safe—specify Ryerson Certified. Shipment is immediate.

RYERSON *Certified* **STEELS**

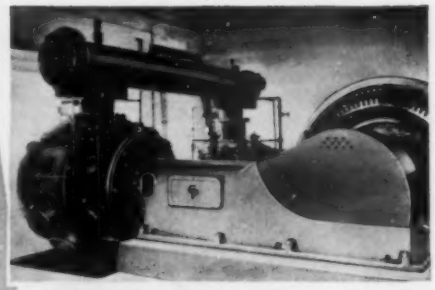
Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON R CERTIFIED STEELS

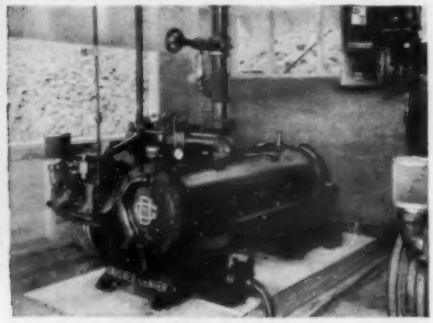
Principal products in stock for Immediate Shipment include—Bars, Structurals, Plates, Iron and Steel Sheets, Tubing, Shafting, Strip Steel, Alloy Steels, Tool Steels, Stainless, Babbitt, Welding Rod, etc.

When air compressor valves are
"SITTIN' PRETTY"

Valves, like this Ingersoll-Rand, will open wide and close air-tight . . . and will keep carbon-free . . . when lubricated with Texaco Alcaid, Algol, or Ursa Oils.



Chicago Pneumatic Tool, like other big compressor manufacturers, approve the use of Texaco Alcaid, Algol, and Ursa Oils for their compressors, large and small.



All Gardner-Denver Compressors can be kept at peak when lubricated with Texaco Alcaid, Algol, or Ursa Oils.

IN YOUR COMPRESSORS, it's *valve action* that tells whether you are getting the right cylinder lubrication.

Using Texaco Alcaid, Algol, or Ursa Oils, your valves will keep clean and operate perfectly; rings also keep free in their grooves, to maintain the all-important piston seal. This series of Texaco Oils is double-distilled, providing greater purity . . . ideal for compressor cylinder lubrication.

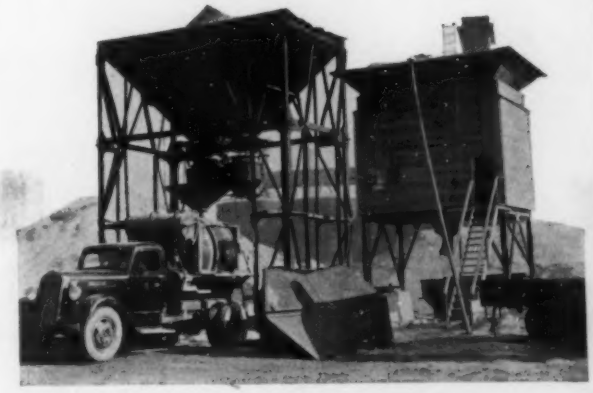
They are freed from tarry, gummy, carbon-forming elements. What slight carbon forms is soft, fluffy; it does not build up deposits that create fire hazards and cause frequent shut-downs for cleaning.

Trained lubrication engineers are available for consultation on the selection and application of Texaco Ursa Oils. Prompt deliveries assured through 2108 warehouse plants throughout the U. S.

The Texas Company, 135 East 42nd Street, New York City.

TEXACO *Compressor* **LUBRICANTS**

Read the Answers



Why Other Dealers Are Going Into "Ready Mixed":

Because the ready-mixed concrete business grew right thru the depression and has one of the brightest futures in America today.

Because there is a better profit in selling ready-mixed concrete than in selling bulk sand, stone and cement.

Because it keeps your men, trucks and equipment working profitably the year 'round.

Because it improves your service, brings you new customers, increases your volume on allied lines.

Because anyone who owns trucks needs but a small additional investment in loading plant and mixers — and it is very easy to expand facilities as needed.

Why Most Successful Plants Buy Jaeger Truck Mixers:

Because Jaeger Truck Mixers produce a higher strength, more workable concrete, proven by impartial, recorded tests.

Because so many engineers and contractors recognize this higher quality and prefer to buy from Jaeger operators.

Because Jaeger 2-speed mixing and faster charging and discharging mean faster trips, more payloads, bigger earnings per unit.

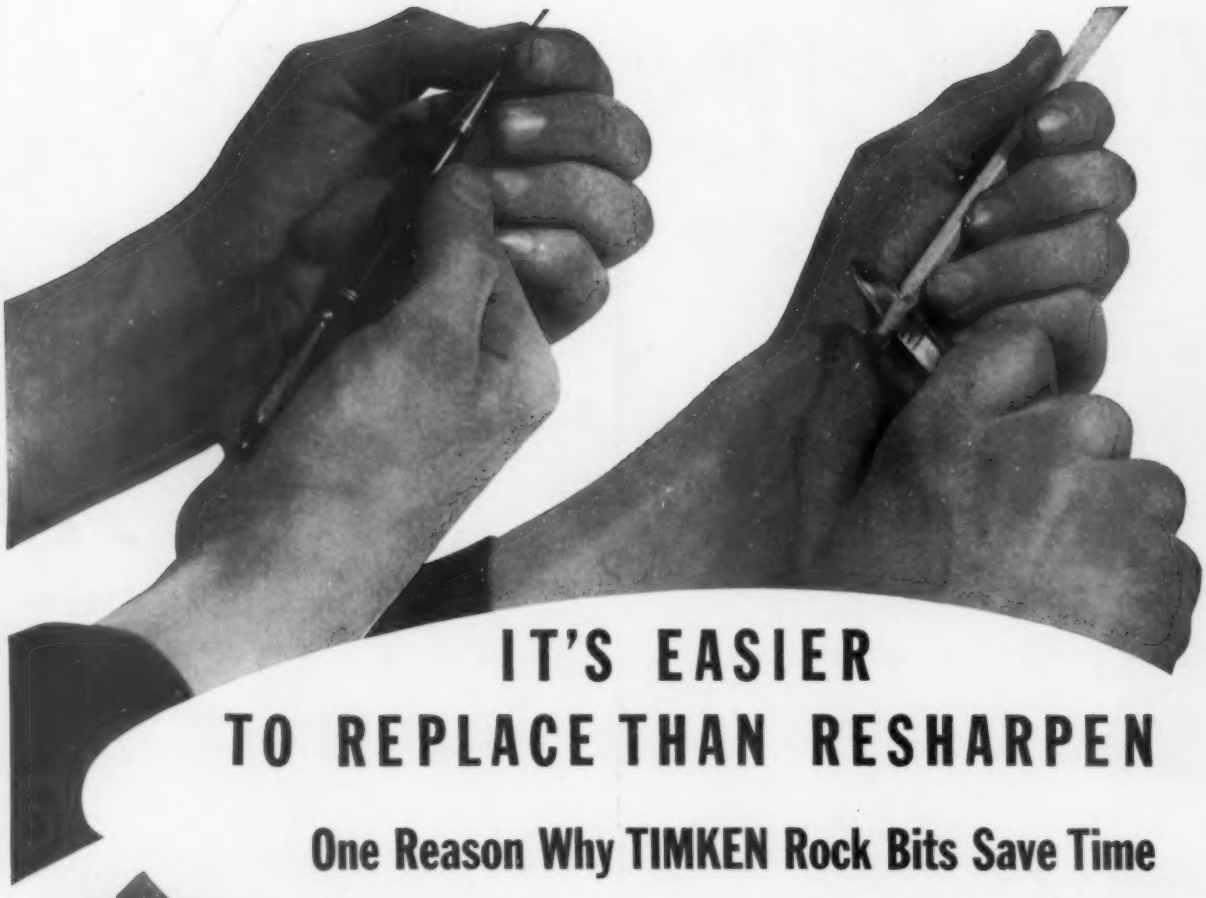
Because Man-Ten alloy steel, 3-point mounting, low center of gravity and correct load distribution make Jaeger maintenance amazingly low.

Because Jaeger operators reorder as they grow — some as often as 10 to 18 times.

30,000,000 CUBIC YARDS OF JAEGER CONCRETE TELL THE STORY — Write today for Specification TM-37, describing Jaeger Truck Mixers and plant methods which have sold far more ready-mixed concrete than any other equipment on the market.
THE JAEGER MACHINE COMPANY, 603 Dublin Avenue, Columbus, Ohio.

JAEGER TRUCK MIXERS

1, 1½, 2-2½, 3, 4, 5, 6 CUBIC YARD SIZES



IT'S EASIER TO REPLACE THAN RESHARPEN

One Reason Why TIMKEN Rock Bits Save Time

When—after a long period of rock drilling—a TIMKEN Bit loses its penetrating power, the driller simply removes it and screws on a new one—a matter of seconds. Then he is all set for another period of uninterrupted hole production.

The simple, practical removable principle that distinguishes TIMKEN Bits is not their only advantage. TIMKEN Bits *drill faster* because they are made of TIMKEN Steel and *deep hardened* for long life.

Their *streamlined* design prevents sticking in the hole—they come out easily.

The motto of American Industry is: "When better equipment becomes available, use it". In rock drilling that means TIMKEN Bits. They will save you time and money.

There is an Authorized Distributor at the other end of your telephone. It will pay you to get in touch with him now.

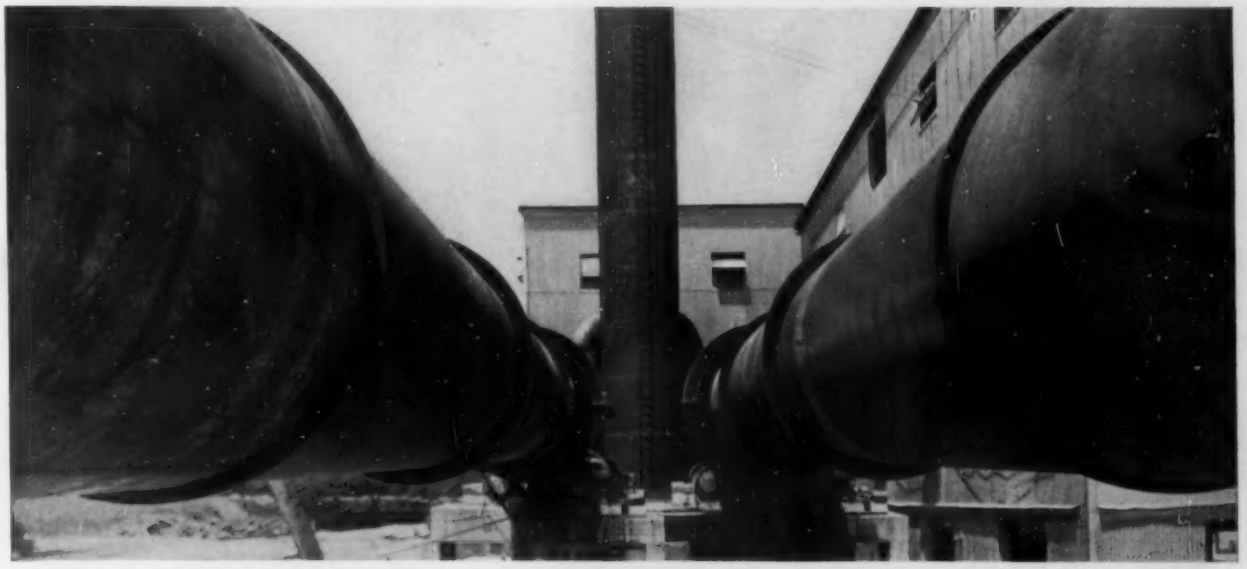
Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

® TRADE-MARK REG. U. S. PAT. OFF.

***TIMKEN**
ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TRAYLOR-CHEESMAN KILN-COOLER-BURNER SYSTEM



saves fuel!

A Traylor Rotary Kiln, fitted with a Traylor-Cheesman Burner, and connected to a Traylor-Cheesman Cooler—in other words, a Traylor-Cheesman Kiln-Cooler-Burner System—form an unbeatable combination for fuel economy, increase of output and improved product. (The Cooler and Burner may be hooked onto ANY rotary kiln.)

The fuel economy is at least 25%, because all of the heat of the calcined material (to within 100° of atmosphere) is recovered in the cooler, and these gases (averaging about 900° F.) are used as preheated combustion air in the kiln.

Also—but why go into further details? Our technician is at your service, to go into the matter to any length you may choose. Write us to have him around, and at the same time ask us for Bulletin 116, covering this subject.

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

Welded or Riveted Stacks, Tanks and Bins for any purpose.

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNSYLVANIA, U.S.A.

NEW YORK CITY 3916 Empire State Bldg.
CHICAGO 815 One La Salle Street Bldg.
SALT LAKE CITY 101 West Second South St.
LOS ANGELES 919 Chester Williams Bldg.
SEATTLE 6311 22nd Ave., N. E.

THE CANADIAN FAIRBANKS-MORSE CO., LTD.
980 St. Antoine St., Montreal, P. Q. Canada

B. C. EQUIPMENT CO.
Vancouver, B. C., Canada

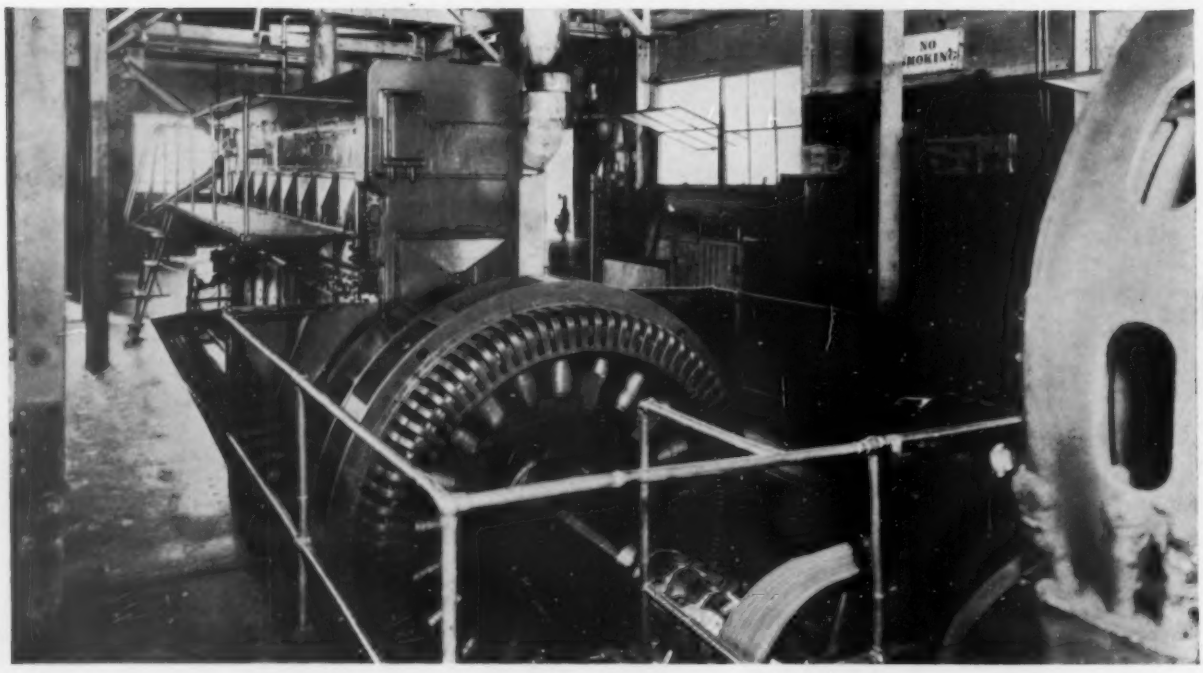
MAQUINARIA
Isabel De Catolica 40, Mexico, D.F.

MANILA MACH. & SUPPLY CO.
Manila and Baguio, P. I.

Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro

European Works—Usines Carels Freres, Ghent, Belgium

Two Dredges of American Aggregates Company Powered with Superior Diesels



The 810 horsepower Superior Diesel in one of the dredges working on the T. V. A. job at Guntersville, Alabama

If there is any one field in which Superior Diesels have been predominately successful, it is in dredging service. It is severe service—24 hours per day—sudden shock loads—frequent overloads—remote locations far from the best service facilities.

Superior Diesels are built for that kind of service because Superior gas engines began to "cut their eye-teeth" on the tough oil field service way back some 48 years ago, and building engines with big crankshafts, plenty of bearing area, dependable combustion systems, the best of lubrication, and lots of reserve power, has been a tradition ever since.

If you have a tough job where you must have low power cost, you should see how Superior Diesels fill the bill.

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H.P., 250 to 720 R.P.M.

111

HIGH SPEED MODELS: 15 to 150 H.P., 900 to 1800 R.P.M.

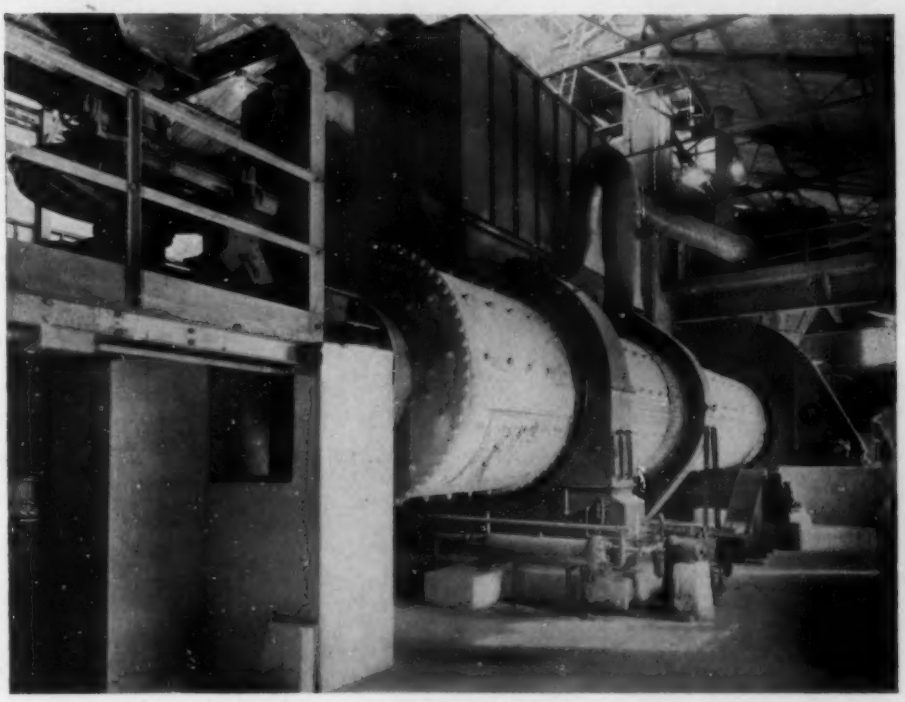
THE NATIONAL SUPPLY COMPANY • SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

GRINDING MACHINERY

Wet grinding or dry grinding—open or closed circuit—gravity discharge or air swept—combined drying and grinding—direct firing or bin system.

KOMINUTER for straight granulating. **TUBEMILL** for straight pulverizing.
UNIDAN multi-compartment mill, combining granulating and pulverizing.
UNIKOM multi-compartment mill with overhung preliminary grinding chamber.
TIRAX multi-compartment air swept mill for drying, grinding coal, etc.
ATOX air swept high speed, vertical shaft mill for drying and grinding.



Unidan Mill

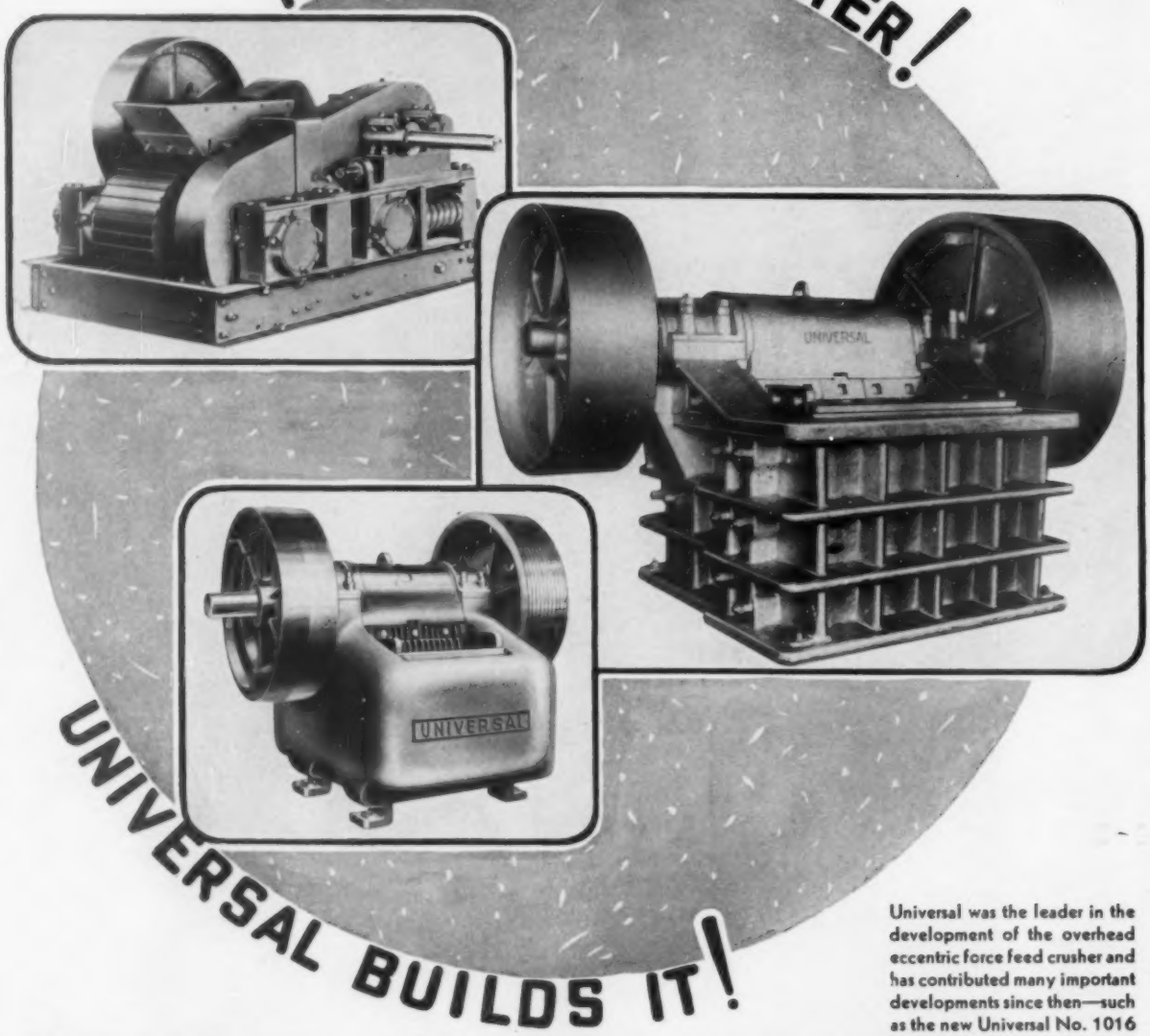
Also a complete line of accessories for the grinding operation such as air separators and classifiers, Trix wet separator, fans, liners, grinding bodies, spray casings, symetro gear boxes, feeders, conveyors, pumps, dust casings, washmills, etc.

An experience of over 50 years in the grinding of miscellaneous materials is available for the solution of your grinding problem.

F. L. SMIDTH & CO.

225 BROADWAY — Engineers — NEW YORK, N. Y.

NAME YOUR CRUSHER!



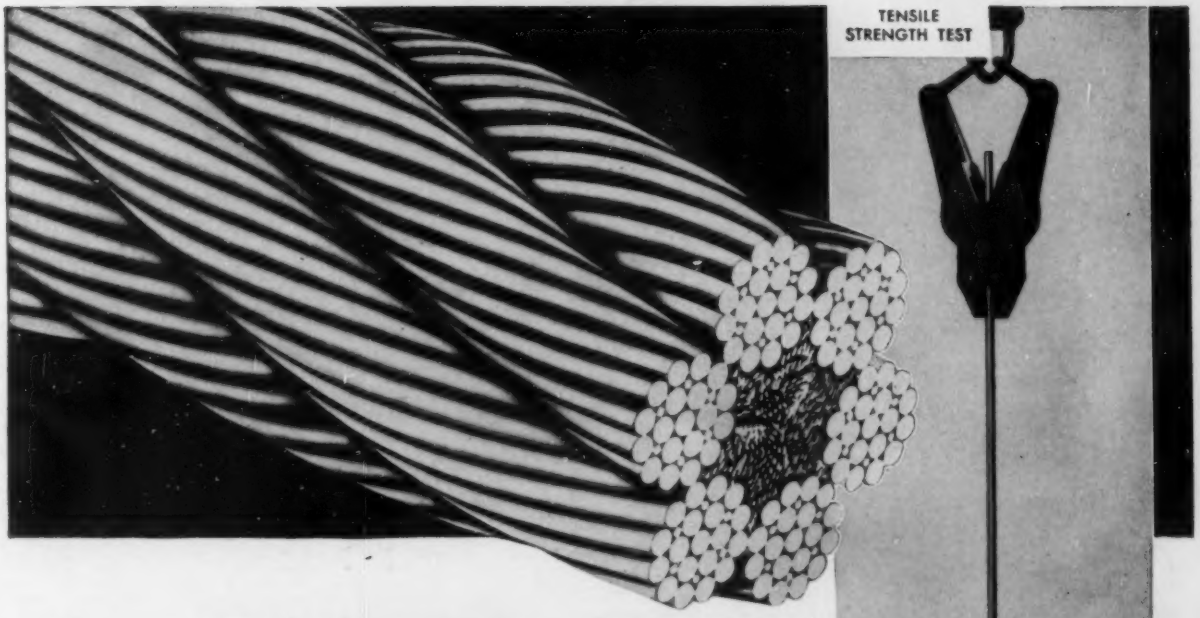
UNIVERSAL BUILDS IT!

Stationary or Portable, Primary and Secondary Jaw Crushers, with bronze or roller bearings, in sizes to meet every crushed stone and gravel requirement. Roll Crushers for secondary crushing; Portable and Semi-Portable Crushing Plants; Trailer Type Crushers, tractor-driven from power take-offs; Portable Apron Conveyor Feed Crusher Units; and, of course, the new Universal No. 1016 Heavy-Duty, Light-Weight Crusher. Just name your needs — if it's modern, low cost crushing equipment, Universal builds it! Send for complete new literature files!

Universal was the leader in the development of the overhead eccentric force feed crusher and has contributed many important developments since then—such as the new Universal No. 1016 Crusher which combines unusual lightness with greater strength. It is only natural that Universal engineers be looked upon as leaders in the field, and it is good business to select your crusher from a firm with such a background as only Universal has.

UNIVERSAL CRUSHER COMPANY
617 C Avenue West
Cedar Rapids, Iowa

UNIVERSAL



WE TESTED THIS 450 TIMES

To prove its Quality

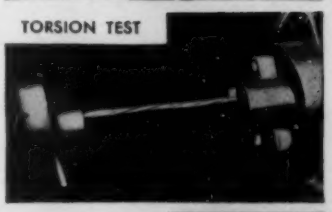
JUST as each part of a well built machine* must be tested individually before it is accepted, so each individual wire in American Tiger Brand Wire Rope is tested at least 3 times, in addition to test for size, before it can pass to the stranding machines.

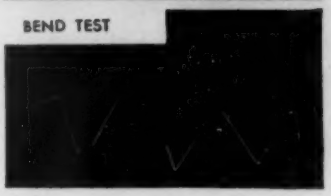
Your work puts wire rope to the severest tests. It must string or reeve easily and quickly . . . spool well . . . avoid whipping at high speeds . . . take the terrific jerks of starting and stopping.

And it is these qualities in American Tiger Brand Wire Rope which have given it a dominant position in the field—qualities which have been built into it by engineers whose wealth of experience is backed by over 100 years of wire making.

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

***USS American Tiger Brand Wire Rope is a machine, more depended on than many. It fits the definition "Any combination of mechanism for utilizing or applying power."**





AMERICAN TIGER BRAND WIRE ROPE

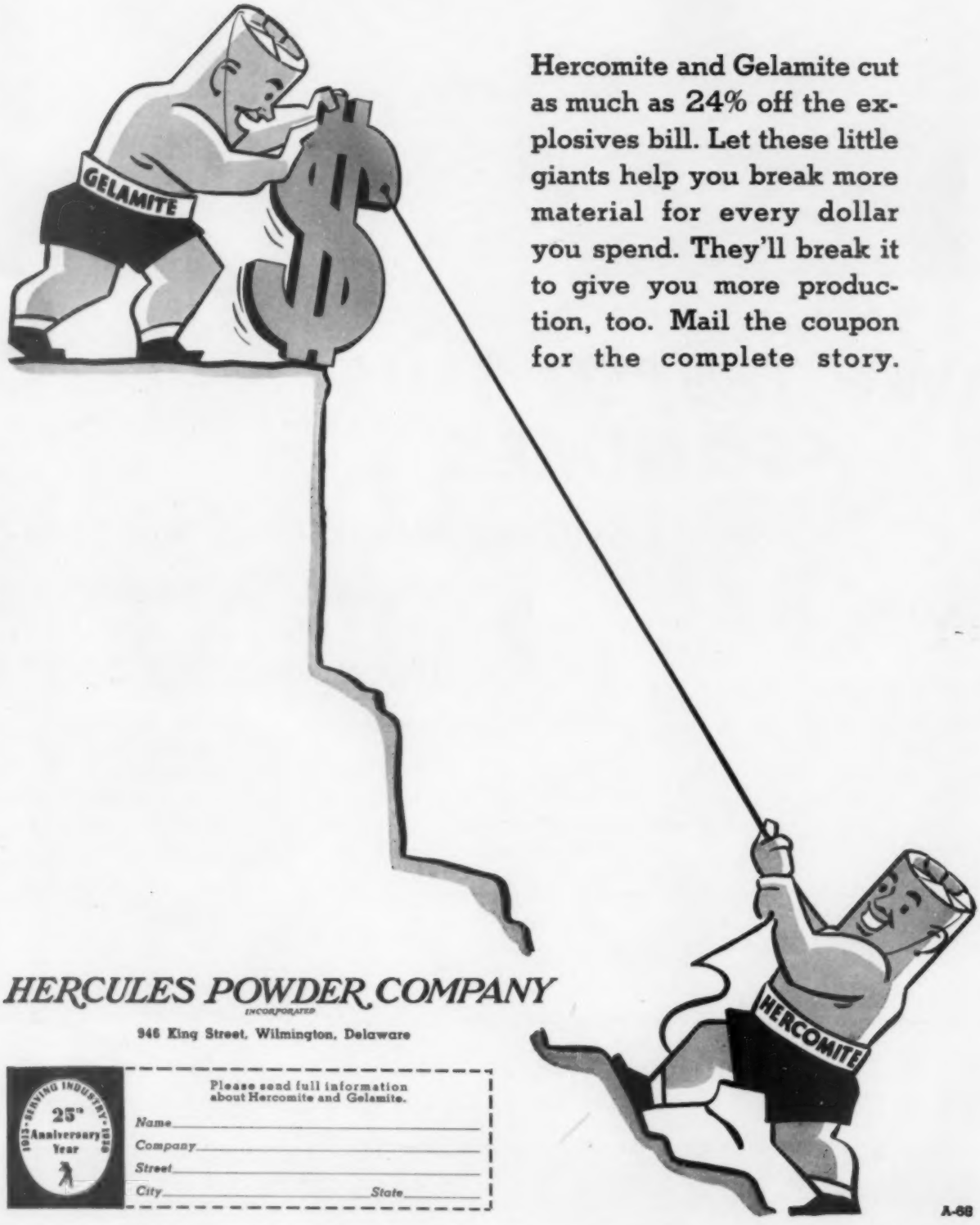
American Tiger Brand Wire Rope. Electrical Wires & Cables. Amerclad All-Rubber Cables. Aerial Tramways. Tiger Wire Rope Slings. Tiger Wire Rope Clips.

AMERICAN STEEL & WIRE COMPANY
COLUMBIA STEEL COMPANY
Russ Building, San Francisco

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

GETTING COSTS DOWN



Hercomite and Gelamite cut as much as 24% off the explosives bill. Let these little giants help you break more material for every dollar you spend. They'll break it to give you more production, too. Mail the coupon for the complete story.

HERCULES POWDER COMPANY
INCORPORATED

946 King Street, Wilmington, Delaware

1913 · SERVING INDUSTRY · 1938
25th Anniversary Year

Please send full information about Hercomite and Gelamite.

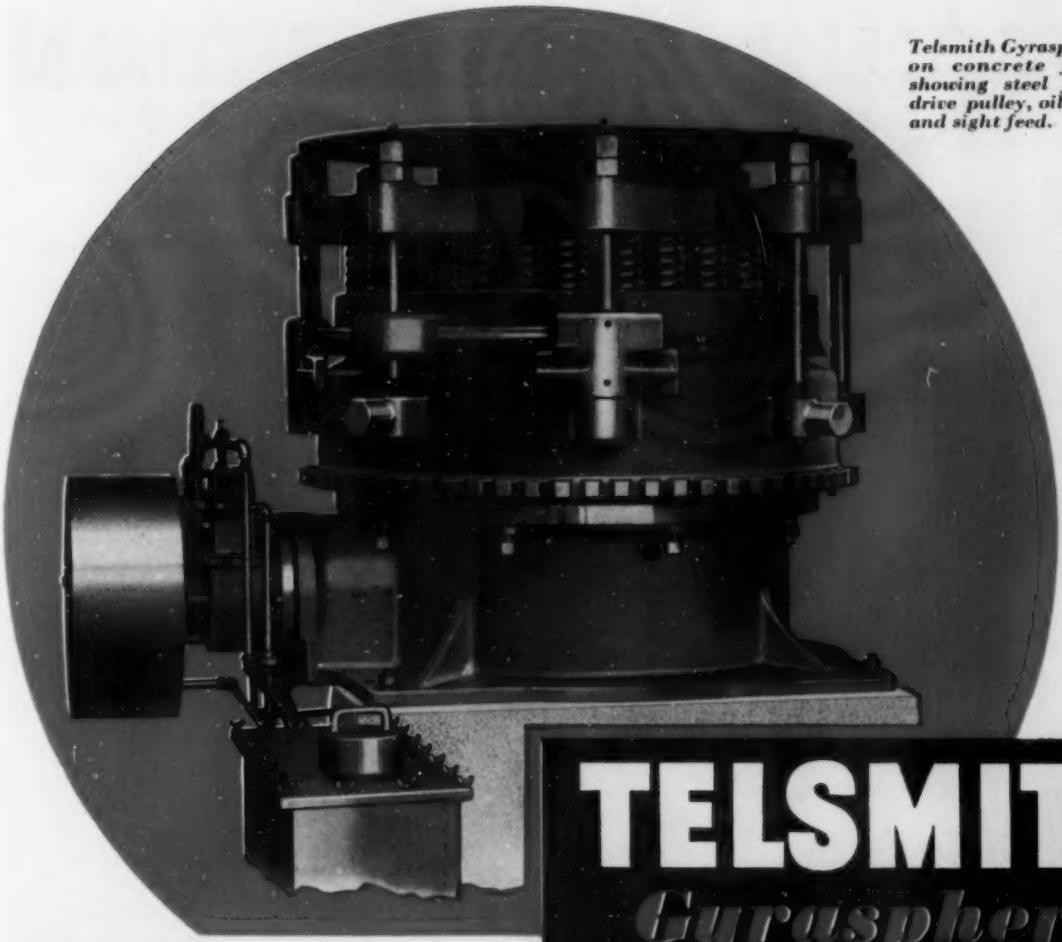
Name_____

Company_____

Street_____

City_____ State_____

A-68



Telsmith Gyrasphere Crusher on concrete foundation, showing steel feed hopper, drive pulley, oil tank, piping and sight feed.

TELSMITH *Gyrasphere* CRUSHERS

GREATER TONNAGE . . . . .
MORE CUBICAL PRODUCT . .
FINER CRUSHING . . . . . .

with less trouble . . . less power . . . less upkeep

Here's a secondary crusher that knows its job—and has what it takes to do it.

It's as simple as that. All *you* have to do *for* the Telsmith-Gyrasphere is to set it for the size you want—ranging from ⅜″ to 1½″ with standard concave; or ⅛″ to ⅜″ with special concave.

Then bring on your rock—and let your conscience be your guide—excess feed means nothing to this baby. The Gyrasphere *can* . . . and does take it! Yes, sir—an unlimited, unregulated choke feed. *That means tonnage!*

When it comes to crushing, the Gyrasphere doesn't "crack down" on the rock. It *thrusts up.* The spherical head and its corresponding concave are like an *inverted* mortar and pestle. Rock is caught between two multi-curved surfaces—and *cubed.* That means an improved product with fewer oversize slabs and splinters.

We could write a book about the Gyrasphere. We have, but it's brief, interesting and gives all the facts. Mailed without cost or obligation. *Ask for Bulletin Y-11.* YC-12

Associates in Canada: Canadian Vickers, Limited, Montreal and Vancouver

50 Church Street, New York City
7016 Euclid Ave., Cleveland, Ohio
211 W. Wacker Drive, Chicago, Ill.
Abrams-Anderson Co., Detroit, Mich.
713 Commercial Trust Bldg., Philadelphia, Pa.
L. V. Fraley & Son, St. Louis, Mo.
81 Binney St., Cambridge, Mass.
Brandeis M. & S. Co., Louisville, Ky.
412 Westinghouse Bldg., Pittsburgh, Pa.
Choctaw C. & M. Co., Memphis, Tenn.

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WIS.

Connect all Holes with Cordeau

EASY as laying a hose . . . and no more hazardous when Cordeau-Bickford, the insensitive detonating fuse, is used. With a bar slid through the core of the Cordeau spool, the coil is easily carried across the tops of the loaded bore holes, unreeling as it goes. Then the end of each branch line is connected firmly so that the detonating wave reaches each charge.

Thousands of holes in a giant blast can be loaded and connected with greater safety and economy when Cordeau-Bickford Detonating Fuse is used. Firing can be planned to give successive relief of burden, effecting maximum work from every charge, and better fragmentation of material.

CB-71

THE ENSIGN-BICKFORD COMPANY • SIMSBURY • CONN.

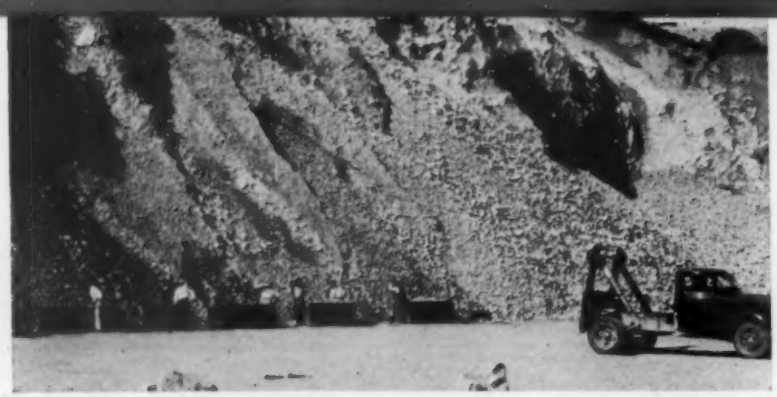
CORDEAU·BICKFORD *Detonating Fuse*

DEMPSTER DUMPSTER

Detachable

•

Automatic Dumping



Self-cleaning

•

One-man Controlled

● *Novella Cement Quarry, Guatemala, C. A.*

Saves its cost in Economies

30% to 50% savings in quarry operations, road work and similar jobs are convincing proof that the DEMPSTER-DUMPSTER is the most practical piece of equipment ever devised for moving any material that is loaded by hand.

The truck with the DEMPSTER-DUMPSTER Hoisting Unit picks up a loaded container, hauls —dumps—and returns the empty container spotting it at the loading point, and proceeds to pick up the next loaded one. One truck unit may serve from 4 to 10 detachable containers, depending upon the distance of the haul.

The DEMPSTER-DUMPSTER is a modern, time-saving, profit-producing method of loading, hauling and discharging materials.

• *View of Dempster-Dumpster in action*

It will pay you to investigate DEMPSTER - DUMPSTER — the modern, time-saving, profit-producing method of loading, hauling and discharging materials. Increase your production and decrease your expenses.

Exclusive sales territory available for responsible dealers

DEMPSTER BROTHERS, INC. KNOXVILLE TENNESSEE

WE HANDLE TOUGH JOBS

● You may be up against a tough screening job, too, like many other producers of gravel or aggregate, but your problem cannot be any tougher than supplying the enormous tonnage of aggregate needed for meeting the schedules of Coulee Dam. ● Four Style "B" Centrifugal Vibrating Screens have been handling the total minus 7-inch feed of this plant since May, 1937, much of the time 21 hours a day, 7 days a week. They have been doing a good sizing job continuously because they are built for that kind of work. The vibrating motion is positive . . . at the same intensity regardless of the load. ● Call in an Allis-Chalmers crushing plant engineer. He will show you why it is that the Style "B" screen will handle more tonnage and larger material, at lower cost, than any other type.

Your screening problem can be economically solved by one of the four types of Allis-Chalmers Vibrating Screens: Aero-Vibe for medium loads and materials; Low-Head for large tonnages and minimum head room; Style "B" Centrifugal for heavy loads and maximum range of material; and the Electro-Magnetic type for fine screening. Allis-Chalmers also builds a complete line of revolving screens.

sss

CRUSHING · CEMENT AND MINING DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

More Pay in Every Payload
FOR PIT AND QUARRY MEN

1938 Ford V-8 Trucks and Commercial Cars have been built to do more work, in less time, at lower cost. Time-proved features, including the famous Ford V-8 engine and the 1938 improvements and refinements, put more pay in every payload.

The Ford V-8 engine is speeding up work for many companies — it continues to roll up new records for performance and economy. The 85-horsepower Ford V-8 Truck engine powers the new 134-inch and 157-inch wheelbase trucks. A choice of either the "85" or "60" V-8 engine is offered in the new 122-inch wheelbase one-ton trucks and the 112-inch wheelbase commercial cars.

The Ford Engine and Parts Exchange Plan is another reason why owners find Ford units profitable and economical to operate. When an overhaul does become necessary, this plan saves time and money — keeps units on the job.

The nearest Ford dealer will lend you a 1938 Ford V-8 Truck or Commercial Car without charge or obligation to make an "on-the-job" test with your own loads and your own driver.

FORD V-8 TRUCKS
AND COMMERCIAL CARS

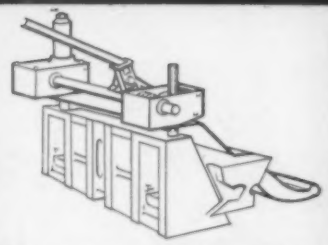
MAKING LITTLE ONES OUT OF BIG ONES

with a Pioneer

24-36

Jaw Crusher

Paul Frank of North Vernon, Indiana, uses a Pioneer 24-36 Jaw Crusher for crushing the big ones. It saves dynamite and hand sledging.



The opening can be adjusted while the crusher is in operation.

•

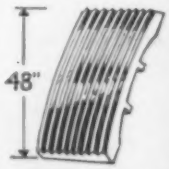
Only 16 ton — Steel castings and overhead eccentric save excess weight.

•

Overhead eccentric gives a force feed action and greater capacity.

•

Manganese steel Jaws 48" deep. Heavy corrugations—and reversible.



SKF

Bearings — Save power, lubrication, and replacements.

PIONEER

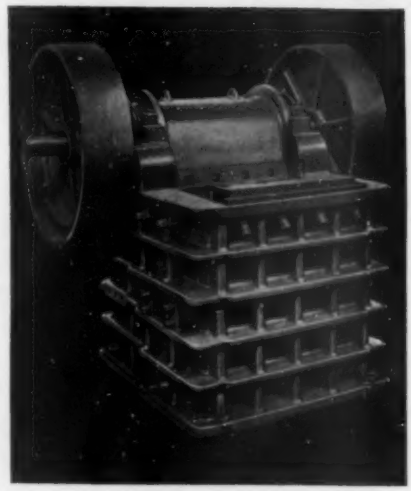
You, too, can solve your primary crushing problems

•

Investigate this 24"x36" Primary Jaw Crusher; it will save you money on your next job.

•

Our representative will call without obligation.

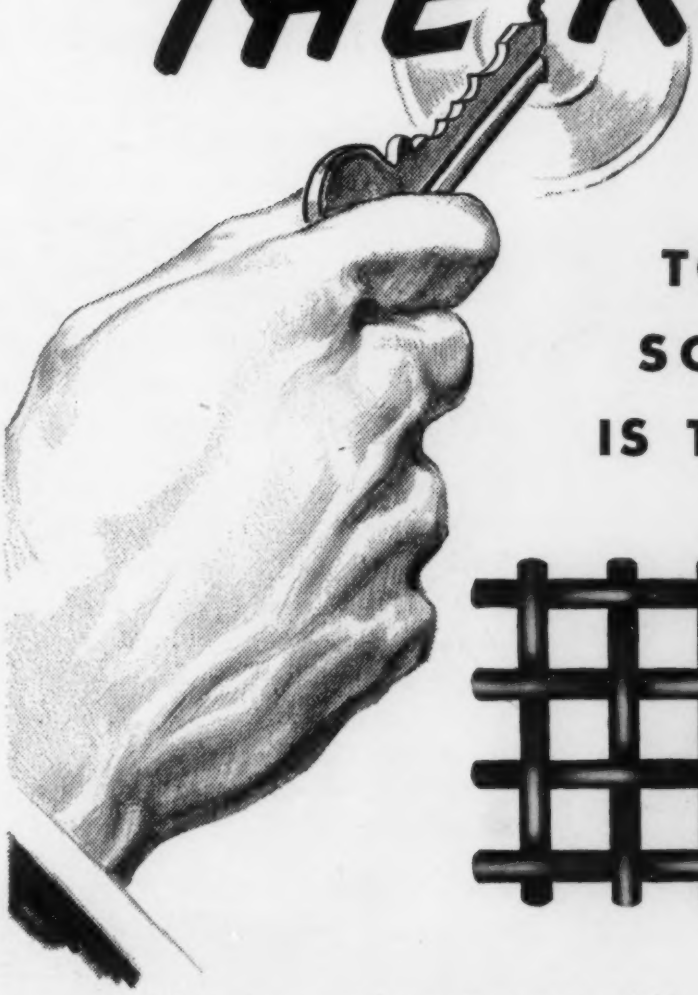


Pioneer Engineering Works

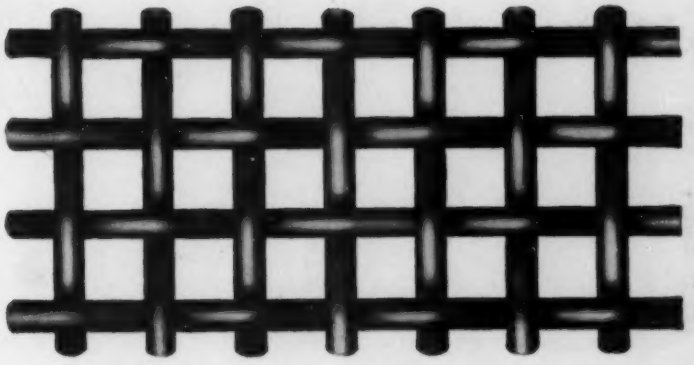
Formerly Pioneer Gravel Equipment Mfg. Co.

1515 CENTRAL - MINNEAPOLIS, MINN.

THE KEY-



TO LONGER SCREEN LIFE IS TOUGH WIRE



There is no short cut to better wire screen . . . but there is a sound basis for selecting screen *wire*. A screen which gives long, efficient service under the constant grind of screening operations must have inherent toughness and stamina in the wire itself.

For over 90 years Roebling has specialized in making wire and wire products, famed for their exceptional strength and stamina.

This wire making knowledge, plus almost 60 years of screen making experience . . . go into every Roebling Wire Screen. That is why we would like to cooperate in solving your own screening problem.

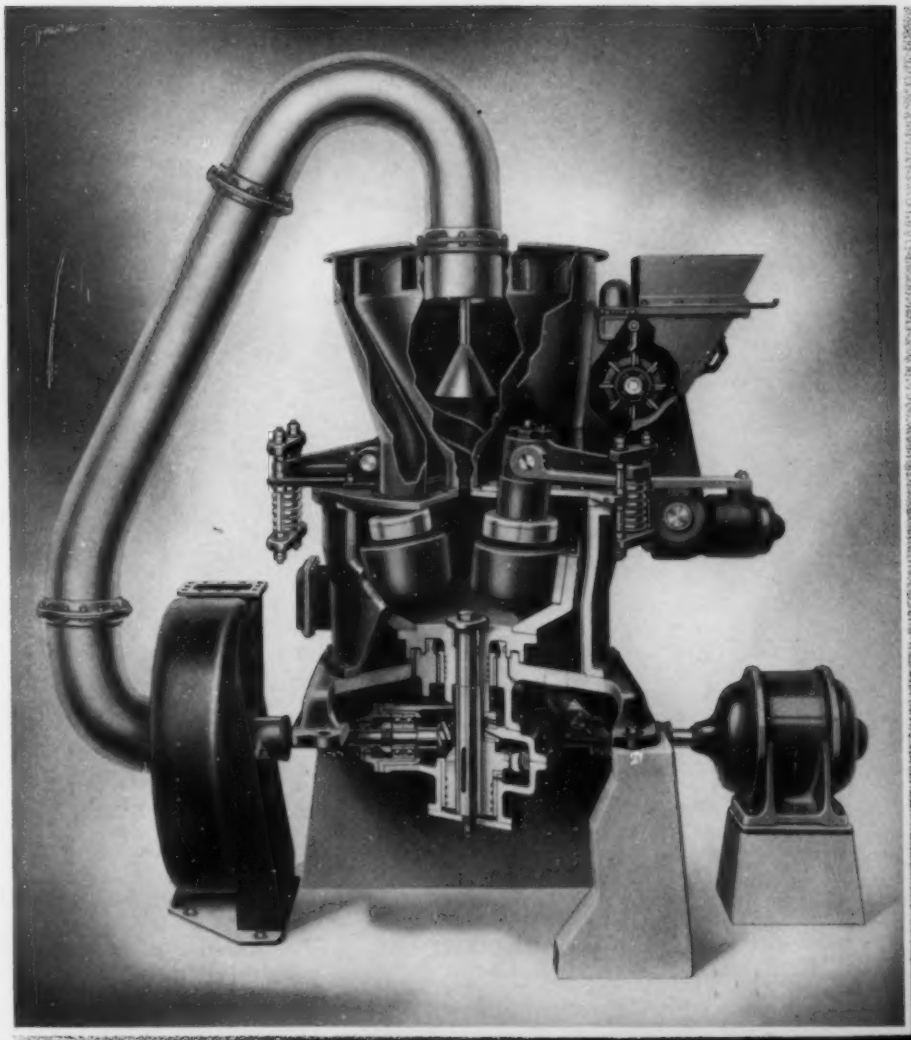
Roebling Wire Screening is available for every sizing, cleaning and grading service.

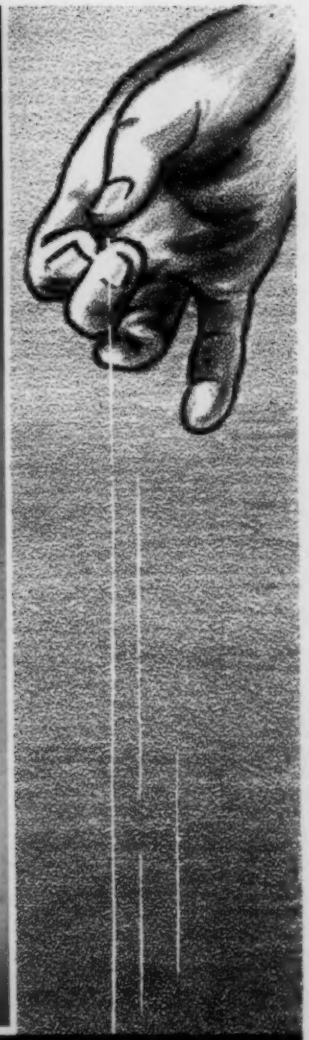
JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

ROEBLING *Wire Screen*

TRADE JERSEY MARK

90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE





BOWL MILL

SO QUIET

YOU CAN HEAR A PIN DROP

SILENCE is eloquent . . . in a machine . . . for it signifies finely engineered construction.

In the quiet, smooth running BOWL MILL, there is no metal-to-metal contact in pulverizing.

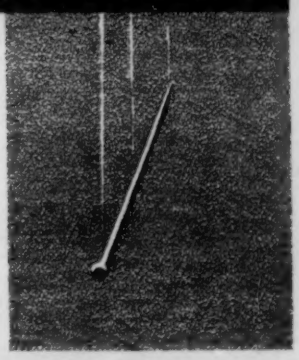
That means vibrationless operation . . . reduced maintenance . . . and increased endurance.

Raymond BOWL MILLS run for months at a time . . . without shut-downs . . . grinding coal and direct-firing rotary kilns at lower costs than ever before obtained.

Only by seeing the BOWL MILL in action, can you appreciate its economy and smooth running qualities.

There are more than 200 BOWL MILLS now in operation in modern industrial plants throughout the country.

Write for Bulletin and list of installations



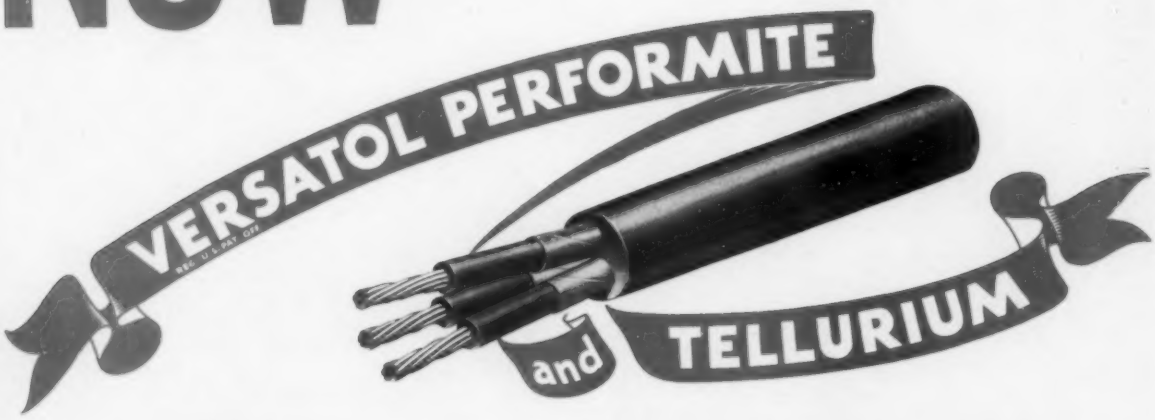
RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1307 North Branch Street CHICAGO

Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

NOW *combined*



A LONG-LIFE NONMETALLIC CABLE

Versatol Performite insulation for dielectric strength.

Tellurium-rubber sheath for mechanical strength.

The two combined form a very simple nonmetallic "parkway" cable that is moisture resisting, long lived, and low priced.

Where Its Use Will Pay

This Type RR cable can be used in almost any place where the standard Type RJ nonmetallic "parkway" cable is now used. That is, buried directly in the ground, run on the ground, under water, or overhead—for all sorts of power, lighting, and even control circuits.

In some places, for safety purposes, the cable may need a metallic shield on each insulated conductor.

Where the cable is to be exposed to the elements, as on overhead lines, an over-all covering, usually jute, is recommended to protect the cable from the direct rays of the sun.

Why It Is Good

You get a cable without lead sheath; no worry about electrolysis, no wiping of joints. Still it sheds water like a duck. It is easy to install. No metal to bother with. You don't need skilled cable splicers.

Besides, this cable is light and flexible—far more so than any armored type. Its price is low, too—lower than that of any metallic-armored type, and just about equal to that of a jute (Type RJ) cable with the same insulation. In many ways, this combination can save money.

A better way to figure: your money will buy more quality, as a study of the properties of Versatol Performite insulation and tellurium sheathing will show.

AN EXAMPLE

This is part of a cable power line in a coal-stripping operation. It is a 3-conductor, 300,000 cir mils, with ground wires. The insulation is Versatol Performite rubber, the jacket is nonhygroscopic tellurium, and the over-all covering is jute.

Versatol Performite: the Dielectric

Versatol Performite insulation combines the properties of heat resistance, moisture resistance, and superaging. It can be operated at 75 C, as compared with 60 C for 30-per-cent insulation; it has the unusually low moisture-absorption factor of 0.010 gram per sq in.; it is a Performite compound, i.e., it can stand 504 hours aging in the oxygen bomb.

Tellurium: the Protection

The name tellurium, as applied to a rubber compound, has become associated with a tough all-rubber jacket for portable cable. But its other properties, such as moisture and acid resistance and long aging, adapt it for many other uses.

To distinguish it, this compound is known as "nonhygroscopic tellurium," and is designated as No. R-8331.

Two leaflets give more details about Versatol Performite and tellurium. They are GEA-2110 and GEA-2111. We shall be glad to send copies, from the nearest G-E sales office or General Electric Co., Dept. 6A-201, Schenectady, New York.

520-115

GENERAL ELECTRIC

● A real "go-getter" . . . designed to deliver maximum yardage under all conditions . . . the half-yard Badger is the ideal small shovel for quarries and non-metallic mines. There is no swinging counterweight to slow down the starting and stopping operation . . . no problem of allowance for tail swing when working in tight corners. The time you save each day through faster start, faster swing, and faster stop means more output . . . more profits.

Whether you are digging overburden, stock piling, loading rock, or operating on clean-up work, the Austin-Western BADGER is the fastest, most economical ½-yard shovel for the job. Compact as it is fast, it is easy to transport from one location to another . . . Rugged and powerful . . . it offers the utmost in capacity, flexibility and durability.

Get the full story of the Badger's outperforming characteristics applied to your specific type of shovel jobs . . . its extra dumping height and reach . . . its convertibility for crane, dragline, or pile driver . . . its savings on fuel and maintenance. Mail coupon.

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

AUSTIN-WESTERN

THE AUSTIN-WESTERN ROAD MACHINERY CO.
1844 Barrows St., Aurora, Illinois

Tell me more about the A-W

- ☐ Badger Shovel
- ☐ Crushing & Washing Plants
- ☐ Trail Cars
- ☐ Send a Salesman
- ☐ 5-Yd. Scraper
- ☐ 12-Yd. Scraper
- ☐ Roll-A-Plane

Name .....

Address .....

City ..... *State* .....

Only with a SYMONS SHORT HEAD CONE CRUSHER *is such production possible*

Big Tonnage...Fine Product . . . Low Crushing Cost . . .

these few words tell the story of the performance of this 7 foot Symons Short Head Cone Crusher.

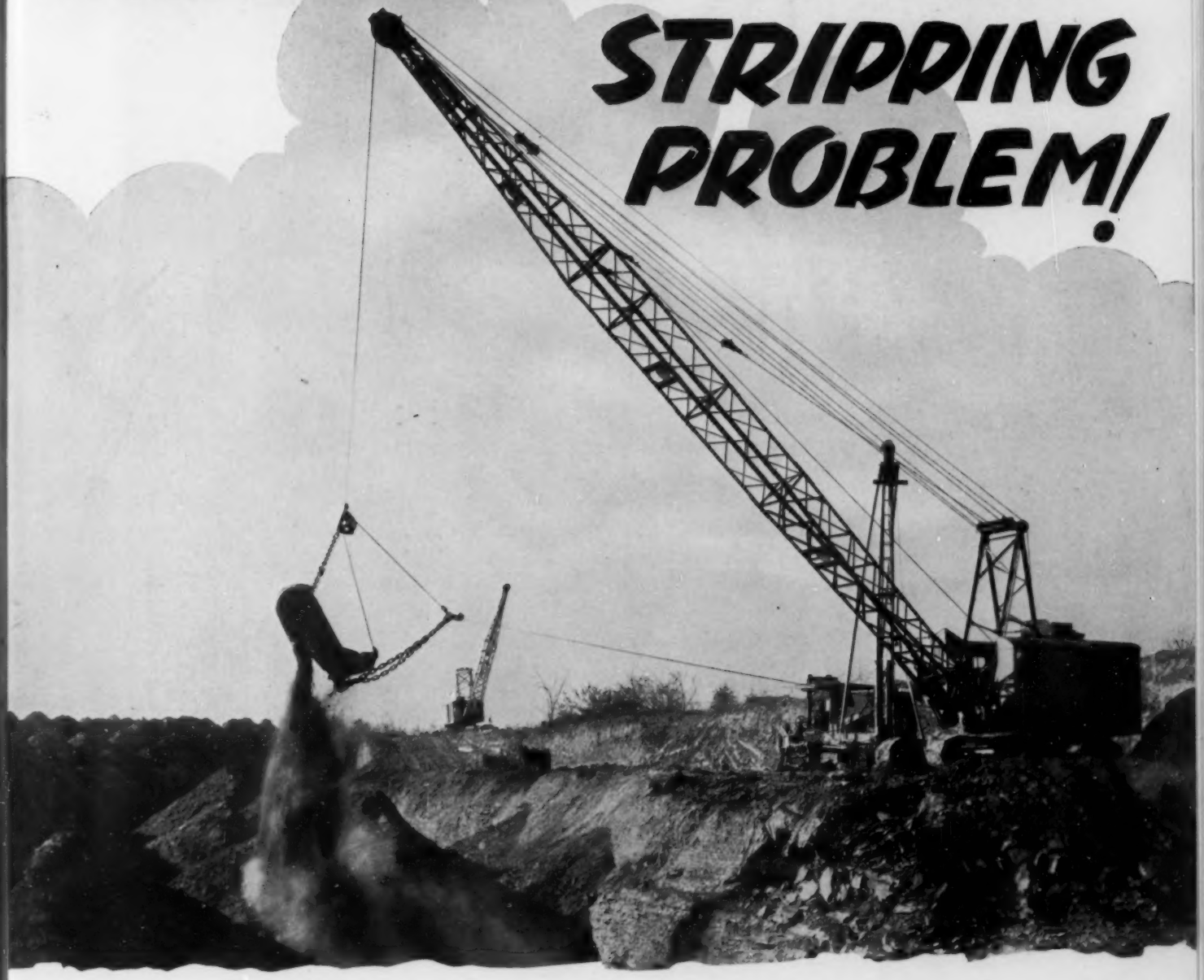
This is one more of the many instances where this type of crusher follows a Symons Standard Cone which had been previously installed. With the Short Head Cone, it is possible to produce fine materials in quantity and in such sizes for which there is a ready demand.

Are you confronted with the problem of quantity production of fine product? If so, why not investigate the advantages of Symons Cones?

NORDBERG MFG. CO. MILWAUKEE, WIS., U. S. A.

NEW YORK 60 East 42nd St. | LOS ANGELES Subway Term. Bldg. | TORONTO, CAN. Concourse Bldg. | LONDON, ENG. Bush House

THE ANSWER TO THAT STRIPPING PROBLEM!



AT one time it would have been thought possible to handle stripping jobs like this only with a much larger machine.

Today, Northwest design, long reach and high capacity makes possible the handling of quarry stripping problems at lower cost and greater speed than ever before. With greater mobility, faster swing, smoother operation, lower first cost, lower operating cost, Northwests save money from the first bucketfull of dirt.

Before considering the solution of your stripping problems, send for a catalog covering the Northwest Model 95 Dragline. This machine has some surprising advantages.

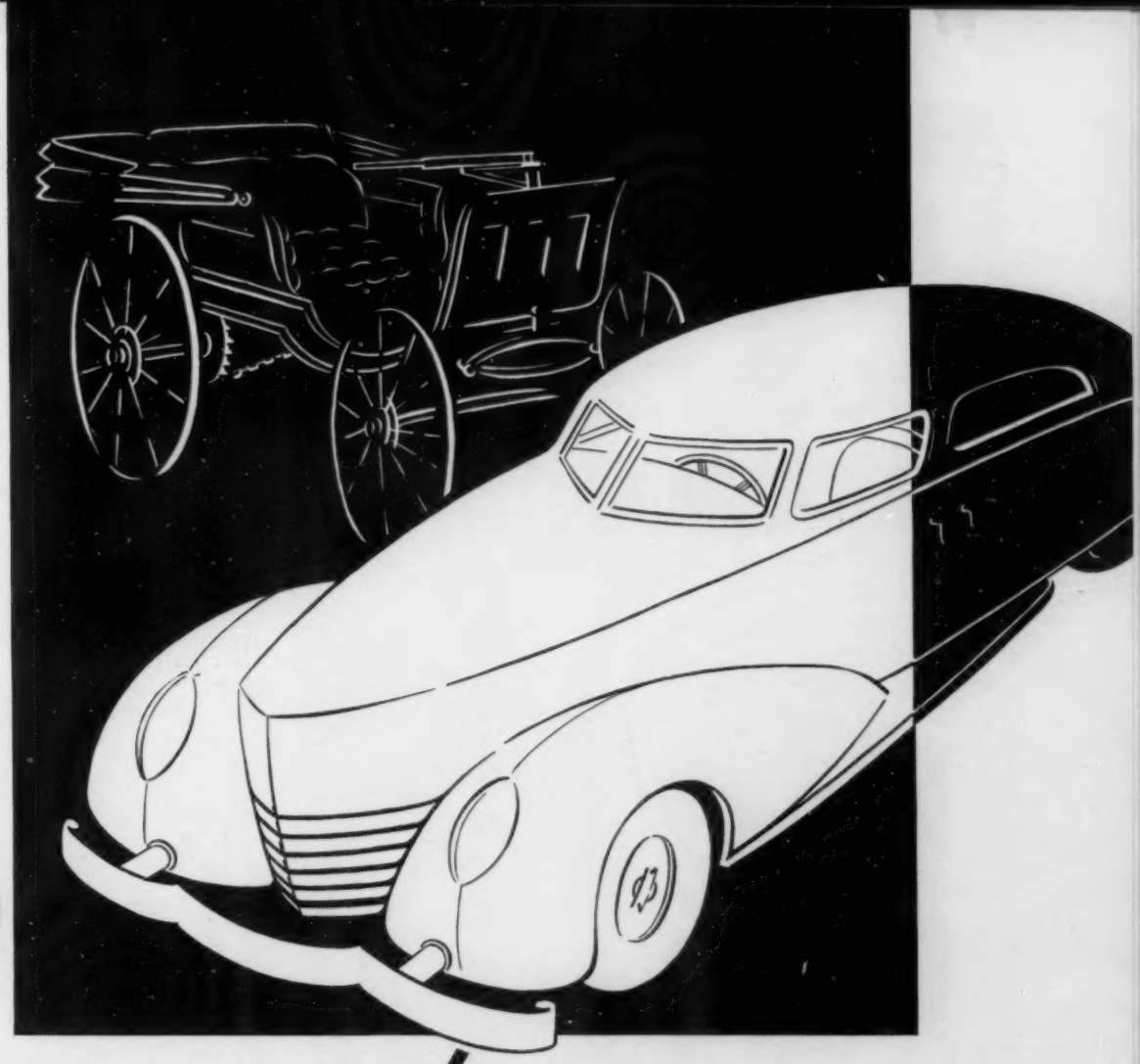
NORTHWEST ENGINEERING COMPANY

1820 Steger Building • 28 East Jackson Boulevard • Chicago, Illinois

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

NORTHWEST

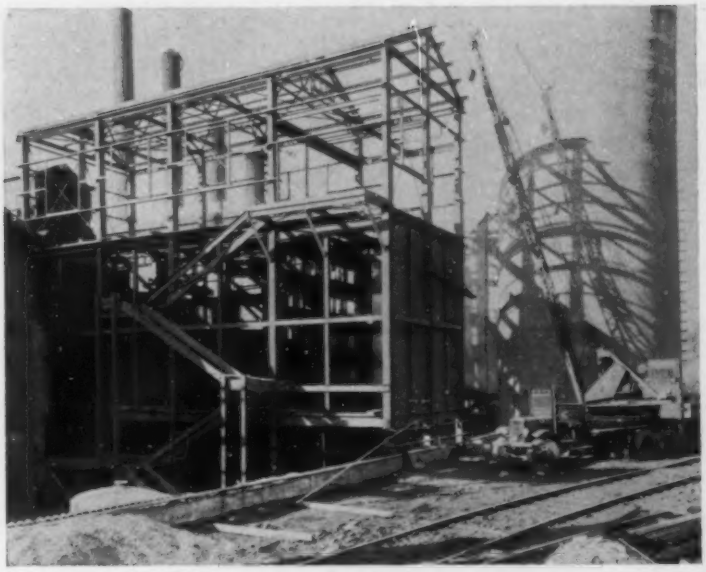


Improvements THAT REFLECT EXPERIENCE • • • ARE SOUND • • •

The courage to attempt . . . to pioneer and sponsor . . . the determination and initiative to follow through year after year with improvements based on experience and sound engineering . . . these alone account for the tremendous progress of the automobile . . . and in no less proportion, the modern Marion Excavator. ● Experience has played a most vital part in Marion's success in improving power shovel performance. It has been responsible for the many exclusive features of design and construction by Marion since its inception. And as the years continue to add to this store of knowlege of material handling requirements . . . so, this knowledge is being applied in all earnestness by Marion to insure maximum yardage at the lowest possible operating cost. The Marion Steam Shovel Company, Marion, Ohio, U. S. A. ●

MARION

EXCAVATORS



Cottrell Electrical Precipitator under construction.

Control DUST FOG FUME MIST

HEADQUARTERS FOR THE SOLUTION OF ALL DUST PROBLEMS

• Western Precipitation Corporation is not a manufacturing organization. For thirty-one years it has devoted its entire time to problems of research in the collection of all kinds of industrial dust, fog, fume and mist.

• After a comprehensive study of a specific problem, Western Precipitation Corporation determines what equipment will do the work to the required efficiency at the lowest operating cost for the longest time. In addition to Cottrell Precipitators, it may recommend Multiclones, Polyclones, Impax Separators, De-dusters or other equipment according to the characteristics of the problem.

• **In many cases this Corporation prepares drawings, supervises construction, runs acceptance tests and turns the equipment over to the owners in operation at a guaranteed efficiency.**

• Plants are available in any size, from a few thousand c.f.m. to several million. Gases may be acid or alkaline, at high temperatures, with recovery to any desired efficiency.

Send for free Bulletins.

COTTRELL PRECIPITATORS

WESTERN PRECIPITATION CORPORATION

1014 West Ninth Street, Los Angeles, California • • New York, N. Y.

PRECIPITATION COMPANY OF CANADA, LTD., Montreal

COTTRELL PRECIPITATORS . . . MULTICLONES . . . SPRAY DRYERS

PIONEER IN DUST AND FUME CONTROL

SHOWING

in picture form the many items of Robins Equipment that you can profitably install and thus lower your cost of handling aggregates.

ROBINS CONVEYING BELT COMPANY
15 PARK ROW, NEW YORK, N. Y.

Please send me the new folder "AGGREGATES"

Name _____

Firm _____

Address _____

City _____ State _____

Rock Products

Vol. 41 Chicago, April, 1938 No. 4

That 8 Billion Dollar Toll Road Project

No one seems to have the temerity to defend it, much less advocate it—that bill of Senator Buckley of Ohio to set up a United States Highway Corporation to spend 8 billion dollars, more or less, on a transcontinental system of super highways. It has been temporarily laid aside by a senate vote referring it to the committee on post office and post roads, which is understood to be against the project. But *Business Week*, which is rather canny in its Washington analyses and predictions, thinks we shall hear more about it in the times to come. So do we; and we don't think the project is half so crazy as a lot of people do.

The federal government has spent something like 8 billion dollars for direct relief in the past five years and we are no nearer an end of such spending than we were when it started. Moreover, we have very little to show for it except the fact that by feeding and clothing ten to twenty million people a year a major social catastrophe probably has been delayed—under the circumstances one can not truthfully say *avoided* because the circumstances are still unchanged and the hazard still exists.

The 8 billions spent for direct relief added at least 8 billions to the national income, which President Roosevelt wants to raise to 100 billions a year. For whatever some one (including the government) spends, some one else (including the government) must receive again as income. If the federal government buys food and clothing direct and gives them to reliefers, and the firms selling the food and clothing pay back the equivalent of the price received to the government in taxes of one kind or another, a dollar of relief money has turned over only *once* usefully. If the government gives relief to its "clients" in the form of cash, the effect is the same. Nothing *net* is added to the national income because the government can spend or pass out to other spenders only what it collects in taxes, or borrows (which it must eventually collect in taxes).

On the other hand the federal Bureau of Public Roads has proved that one dollar spent for highways turns over an average of 3½ times—spent by labor, contractors, machinery and material manufacturers, etc.—just in the way of business of those directly concerned. It does not take into account the use of profits and wages for automobiles, radios, furniture, cosmetics, and what not, that those dependent on bare relief are denied. Therefore, instead of adding 8 billion dollars to national income and subtracting 8 billion dollars at the same time, leaving a net national income of zero, spending 8 billion dollars in a business-like way for an honest-to-goodness highway system means a national income of at least 25 billion dollars, which, less the original 8 billion recoverable as taxes in some form, means a net gain of 17 or 18 billion dollars in national income.

We don't know what the merits of the superhighway scheme are as a self-liquidating investment. It is conceivable that with proper business management it could be made so. Even if it didn't prove so, the scheme could be justified on military grounds, or as an investment in the public welfare and enjoyment. Battleships are not self-liquidating, nor is the rest of the enormous expense for national defense; yet we do not oppose them because we realize we live in a world that requires them.

We also live in a country that requires that something useful be found for 10 or 12 million people to do. Every one is beefing about the fact that these millions are idle because private capital has taken to the woods, for one reason or another, which is beside the point. If private business and industry will not spend money for capital improvements—structures—for whatever reason, the public *must*, for only by such constant capital expenditure can these millions be usefully employed. If private investors continue to wait for a time when they will have less of a tax burden, they will wait a long time, and their posterity will have no private investments left.

The super highway scheme is said to appeal to the President because by stressing the self-liquidating feature he can divert attention for the present from the fact that the money must eventually be wrung from taxpayers. Incidentally, on March 19, the President withdrew his objection to apportionment of the 1939 regular federal-aid funds. It all goes to prove that in one way or another paved highways are about the best investment the public can make even though they are built in advance of an economic or business justification.

The real point is that conditions are such that the federal government will soon be compelled to spend large sums for *something*. The actual money in circulation at various times does not vary much. The amount of credit in use varies greatly. The amount of credit money (bank checks, etc.) is largely what national income is really measured by, not coins or dollar bills. The amount of credit is a direct measure of the number of times the same dollar is used in a given time—say a year. Therefore the way to create more national income is to make dollars work, or turn over, as fast as possible. Business money does; relief money does not.

Nathan C. Rockwood

Crushing Plant Designed for Heavy Production of

STONE SAND and AGGREGATES

By W. B. BOBBITT
Works Manager, Radford Limestone Co., Inc.

THE RADFORD LIMESTONE CO., East Radford, Va., owns and operates a crushing plant with a capacity of approximately 2000 tons per day of coarse aggregates ranging in size from 4-in. to 0, and 500 tons of dolomite sand per day, 95 percent through No. 4 mesh.

Recently the company secured the contract to supply crushed stone for use in building the Claytor Dam by the Appalachian Electric Power Co. across New River not far from their quarry. The order calls for approximately 275,000 tons of coarse aggregates ranging in sizes from 3½-in. to ⅜-in., and 150,000 tons of dolomite sand, 95 percent passing a No. 4 mesh, 60 to 75 percent passing a No. 16, and 15 percent passing a No. 100.

Main Crushing Plant

The main crushing plant has one 42-in. Allis-Chalmers Superior McCully crusher that discharges on to a 36-in. belt conveyor at the rate of 250 tons per hour. The crushed material is carried to a 60-in. x 20-ft. Allis-Chalmers scalping screen, and the plus 1¾-in. is scalped out and dropped into a No. 8 K Allis-Chalmers crusher. This crusher discharges on to a 30-in belt conveyor that carries the stone to the main sizing screen which is a two-deck 5- x 12-ft. Niagara.

Plus 3½-in. material is returned to a 10-in. Superior McCully reduction crusher which discharges on to the same belt and is carried back to the main sizing screen. Since the coarse aggregate for the Claytor Dam is being furnished in three different sizes, the minus 3½-in. to 1½-in., passes through the top deck of the main sizing screen and is retained on the bottom deck. This stone passes directly to the bins or is returned to the re-crushers when necessary. The minus 1½-in. is dropped into a 30-ft. elevator that carries it to a 4- x 14-ft. two-deck Niagara, the top deck of which is equipped with a ¾-in. opening and the bottom deck with ⅜-in. A part of the minus 1½-in. and plus ¾-in. that passes over the top deck goes directly to the bins and the other part is fed by a 20-in. conveyor to a No. 25 and a No. 19 Kennedy ball-bearing, gearless crusher and a 1-ft. 8-in. Traylor TY crusher for making sand. The minus ¾-in. and plus ⅜-in. which passes through the top deck and is retained on the bottom deck, is handled in the same way as the stone that passes over the top deck. The minus ⅜-in. which passes through the bottom deck discharges on to a 4- x 8-ft. two-deck Allis-Chalmers Aero-Vib screen, the top deck of which is equipped with a 5/16-in. opening, and the bottom deck 3/16-in.

Stone that passes over the top and bottom decks is fed by a belt conveyor directly to the sand grinding units. The minus 3/16-in. stone, passing through the bottom deck, drops into a storage bin and is fed by a Jeffrey electric feeder to a 6- x 10-ft. Allis-Chalmers rod mill, which breaks up the flat particles to make a satisfactorily shaped grain of sand.

Minus 1¾-in. material from the scalping screen, which is approximately 25

Crushing plant has a capacity of 2000 tons per day of aggregates, ranging in size from 4-in. to 0-in., and 500 tons of dolomite sand per day, 95 percent through No. 4 mesh

Quarry face is 1800-ft. long and 160-ft. high with strata from 1 to 4-ft. in thickness. Wagon drills are shown working on the face, and locomotive, quarry cars, and crane may be seen removing broken stone blasted down. Inset: Close-up of workmen operating drifters, drilling for toe blasts, and breaking up large rocks with jackhammers

percent of the total production and consists of approximately 20 percent clay at certain times, is carried by a belt conveyor to a 3- x 10-ft. 3-deck Niagara screen, equipped with a series of nozzles, which spray water at 60 lb. pressure. Over this screen is a specially designed washing arrangement that works the stone and clay into a thin solution, which is quite an advantage. The top deck of this screen is equipped with ¾-in. square openings, the second deck with ⅜-in. openings, and the bottom deck with 3/16-in. openings. Stone passing over the top deck and the stone over the second and third decks, goes into separate bins. It is soaked for an hour or so and then discharged from the side of the bin into a long curved chute, which carries it to a Link-Belt 20-in. double-screw washer and then up an elevator, 30-ft. centers, and over a 3- x 8-ft. Nordberg vibrating screen into the railroad cars.

The minus 3/16-in., passing through the bottom deck together with the dirty water, goes to a large sand drag which floats off the dirty water and delivers the stone by chute to the storage pile on the ground. A large percentage of this material is sold for private driveways and roads. If the consistency of the clay is such that the 20-in. Link-Belt screw washer and the nozzles on the Nordberg screen are unable to clean the stone sufficiently for shipment, it is allowed to stand over night and the next day is transferred at very little cost to other cars through a specially designed auxiliary washer made by Allis-Chalmers which gives a 100 percent clean product. The time element has been used as much as possible in the washing of the stone.

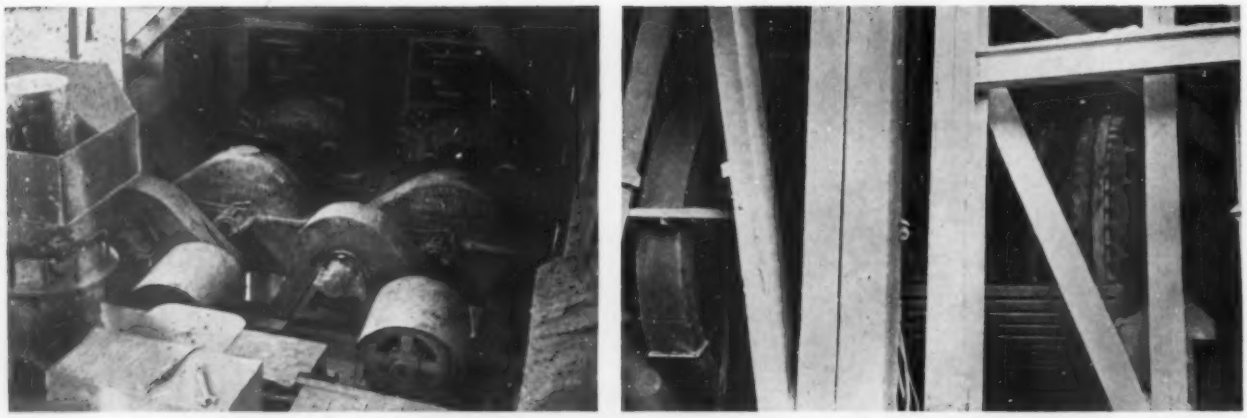
Dolomite Sand Plant

Considerable time and thought was given to the manufacture of dolomite sand due to the quality of the sand required for the Claytor Project. At first it was planned to make the sand with small gyratory crushers as an economical method, but due to the large free silica content in the stone, these crushers produced a very flat shaped grain which can readily be seen in the accompanying illustration. This product was not at all satisfactory in the mixing of the concrete. It was then found that either a Kent mill or a Sturtevant mill, which are of the ring roll type and do their best and most efficient work with a large circulating load, would make a beautifully shaped product, which can be seen in the illustration, with a feed of plus No. 4 which is the top size of the sand, but would not re-shape the minus No. 4 which comes directly from the gyratory crushers. We were then up against the problem of finding a machine that would re-shape this material or having to waste it. After investigating it was found that the rod mill did this work very satisfactorily.

The following machinery is used in the manufacture of the sand: one No. 7 Maxecon-Kent mill; three No. 2 Sturtevant ring roll mills; and one 6- x 10-ft. Allis-Chalmers rod mill.

These mills all discharge into a totally enclosed Link-Belt steel elevator, 56-ft. centers. This elevator discharges on to two FB-4 Jeffrey electric screens. The plus No. 4 is returned to the Sturtevant mills for further reduction and the minus No. 4 drops into a 20-in. Link-Belt screw washer, which is being used for classifying and de-watering the sand. The screw washer discharges into a 120-ton steel bin, especially built to handle wet sand. Feed to the different sand units is explained in the second paragraph under the heading "Main Crushing Plant."

Pumping station equipment consists of two 1000-gal. centrifugal pumps both of which are used in connection with the washing of the stone; one 5000-gal. per hour Fairbanks-Morse automatic pump for furnishing water for the shovels, locomotives and air compressors; one 500-gal., 6-stage Scranton pump for use in stripping the clay from the top of the quarry. This pumps against a 950-ft. head, and is coupled to the fire protection lines leading to the plant.



Left: Ring roll mills handle large circulating load of plus No. 4 in the production of dolomite sand. Right: Rod mill found to be most effective in reducing minus No. 4 material to dolomite sand

The quarry has a face approximately 1800-ft. long by 160 ft. high, and the strata, which stand on edge, are from 1-ft. to 4-ft. in thickness.

Quarry Operations

At first well drills were used, but it was found that they were not economical. Then jackhamers were used for a year or so, but later we found that the use of Ingersoll-Rand wagon drills, drilling 36-ft. holes, was the most economical and satisfactory way this work could be done. After the stone has been blasted down and all secondary work finished, it is then loaded into 5- and 8-cu. yd. quarry cars by a model 480 and one model 32 Marion steam shovel, and hauled by small locomotives and dumped into the 42-in. crusher.

Three Ingersoll-Rand compressors with a total capacity of 1450 cu. ft. of free air comprise the compressor air plant. There is a very efficient repair shop in which we are able to take care of practically all of our heavy repair work.

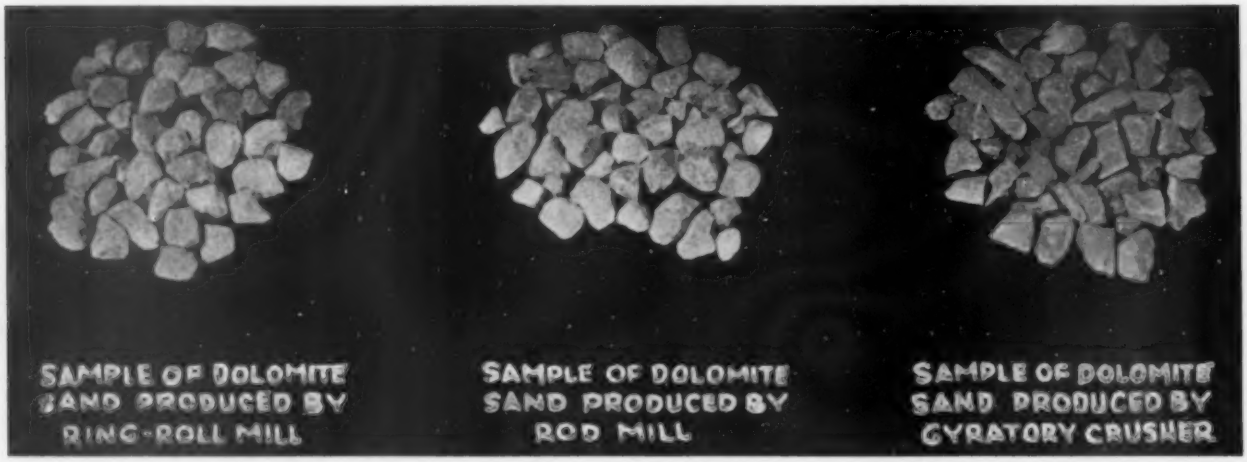
The main office of the Radford Limestone Co. is located at 30 Church St., New York, N. Y. Official personnel is as follows: George N. Tidd, president; Graham Claytor, vice-president in charge of operations; Philip Sporn, vice-president and chief engineer; W. B. Bobbitt, works manager; W. O. Dill, plant office manager; G. E. Williams, plant superintendent; and Sam Shelor, quarry superintendent. H. S. Slocum is also connected with the company in an advisory capacity.

FHA Stimulates Building

Up to $3,000,000,000 in mortgage insurance may be carried by the Federal Housing Administration under the new act which is now in effect. It is confidently believed by the Administration that the lower cost of financing will stimulate residential building to large proportions. The amended act permits the FHA to insure mortgages up to 90 percent on homes costing $6000 or less, and on more costly homes the government will insure 90 percent of the first $6000 and 80 percent of the balance. Formerly the maximum was 80 percent. The present mortgage insurance premium of ½ of 1 percent is reduced to ¼ of 1 percent on homes costing $6000 or less but retained at ½ of 1 percent on the others. Interest rates and service charges are cut from 5½ percent to 5 percent, and payments will be on the outstanding balance instead of the original face value. In the field of heavy construction, the act permits insurance of private ventures up to $200,000 and limited dividend housing units up to $5,000,000 each. The law also authorizes establishment of national mortgage associations to underwrite mortgages.

Open New Quarry

Felix Dunn has opened a new quarry near Romona, Ind., the limestone from which is said to be particularly adaptable for agricultural use. A new company is being formed to operate the property which will have a daily capacity of 60 to 70 tons of commercial stone and 100 tons of agricultural limestone. About $6000 in equipment is now in operation and additional capital of $15,000 to $20,000 is to be invested.



Samples of dolomite sand produced by three crushing methods: ring roll mill, rod mill, and gyratory crusher. Note the flat shaped product from the gyratory crusher

Interesting Technical Data Compiled From Field Survey

MINERAL WOOL

By J. R. THOENEN*
Supervising Engineer, Non-metallic Mining Section,
Mining Division, Bureau of Mines

INTERESTING TECHNICAL DATA on mineral wool has been compiled as a result of a field survey recently completed by the Bureau of Mines. Certain general conclusions and data were published in the report of the American Institute of Mining Engineers' meeting appearing in ROCK PRODUCTS, November, 1937, page 48, but the complete report of the survey is now available.

The report classifies mineral wools into three groups; rock wool, slag wool, and glass wool, and describes the various marketable forms and uses. Due to the confidential character of the information, names of producers are not given; but the plants are designated by number. Under each plant are listed the following data: raw material, but not the proportions, although the methods of proportioning and the manner in which it is fed are given in some cases; recovery of loose wool as compared with raw material fed into the cupola; fuel ratio; plant capacity; cupola dimensions and specifications; slag stream length; steam jet; type and steam pressure; wool rooms; type of granulator; and methods of removing shot.

Although the manufacture of mineral wool is a comparatively simple process and requires a relatively small amount of capital, (estimated at $50,000 to $60,000 for a plant producing 1000-lb. per hour) demands for specification products will necessitate more technical knowledge and closer control of operations. However, as mineral wool is a bulky material (usually not more than 12 tons can be packed in a freight car), it is expensive to ship long distances and for that reason, and the wide distribution of raw materials, the manufacture of mineral wool will continue to be a so-called decentralized industry.

Items in the manufacturing process that require careful technical study and control by an established producer and that hold potential trouble for the prospective producer are, as follows:

1. Chemical and physical composition of raw materials.
2. Type of melting furnace.
3. Melting and blowing temperature.
4. Blowing technique.
5. Shot prevention or removal.
6. Consumer's specification requirements.

*Abstracted from Bureau of Mines Information Circular 6984.

Raw materials for the manufacture of mineral wool present an extended list today, and include the natural "wool rock" of Indiana, classed as a calcareous shale or argillaceous limestone; common shale, clay; combinations of calcareous and silicious materials, including waste glass, waste china, and even soil; and iron, copper, and lead blast furnace slags. The Illinois Geological Survey also suggests the possibility of manufacturing wool from charges containing sand and gravel, common clay, or other unconsolidated materials. Unconsolidated fine materials, however, cannot be used in water-jacketed or brick-lined cupolas because of the difficulty of forcing a draft through them. This confines the selection of raw materials for cupola melting to products in sizes large enough to permit free passage of furnace gases. In addition, it is necessary that the material retain its shape to the melting zone.

The greatest variation, however, lies in the chemical composition of the raw material. Some operators attempt to achieve and maintain a chemical balance between acids and bases in the cupola charge. Others contend that this is not necessary and that better wool results when there is a definitely greater percentage of acids over bases, or vice versa. While neither contention is supported in the report, it is pointed out that similar chemical compositions in the cupola charge may be obtained by combining two, three, four, or more of a large number of natural or waste materials and that the chemical composition of the charge is reflected in the chemical composition of the wool.

Practically all mineral wool is made in water-jacketed cupolas, the original brick-lined cupola having almost disappeared. While cupolas require raw material to be in lump form to permit the passage of furnace gases, one manufacturer has been successful in briquetting fine unconsolidated materials so that they may be melted in a cupola. Another operator is using a conical cupola instead of the cylindrical type.

The reverberatory type of furnace has been used in the manufacture of mineral wool, and glass wool is being made in a similar type of furnace. Finely divided unconsolidated materials can be handled in this type of furnace as it is not necessary to pass furnace gases through them. With cupolas there is considerable waste in the form of shot, but with the reverberatory type furnace the shot can be remelted to make more wool.

It is difficult to determine the temperatures maintained in the melting zone and the blowing temperature or temperature of the issuing slag stream. Thermocouples have been placed in the furnace wall or near the melting zone from which actual melting temperatures are calculated. The blowing temperature is gauged by the color. Both melting and blowing temperatures are important in mineral wool manufacture as the physical characteristics of the wool (shot content, fiber diameter, fiber length, etc.), with the same raw materials, will vary with different temperatures. A change in chemical composition or physical characteristics of the furnace charge may require a radical difference in melting temperature, whereas better wool may result without change in the original blowing temperature.

The length of drop of the slag stream from tap hole to steam jet has a very appreciable effect on the characteristics of the wool. Melting and blowing temperatures as well as chemical composition affect the viscosity of the slag which is an important factor in the shearing action of the steam or air jet and its ability to produce fine or coarse fiber and a minimum or maximum of shot. The diameter of the descending slag stream also is an important factor in evaluating the ability of the steam jet to shear or break it into globules. One experimenter found that the farther he could drop the slag to the steam jet without cooling or destroying the continuity of the stream, the better wool he could make.

For blowing, the conventional V-type nozzle is commonly used, but the length and width of the slots and the angle between them is still a matter of preference. Recent improvements of the nozzle include: a curved face nozzle, a recessed nozzle to avoid objectionable air currents, and a newly patented nozzle with an annular steam orifice through the center of which the slag is passed. (Continued on page 40)

Increase Screening and Storage Capacity to

MEET ALL SIZE SPECIFICATIONS

By BROR NORDBERG

ADDITION OF THREE LARGE DOUBLE-DECK vibrating screens to increase the screening surface and erection of four additional storage bins with a combined capacity of 1000 tons have enabled the Independence, Mo., plant of the Stewart Sand and Material Co. to produce any required stone size specification directly or by re-combining stone from any bins over a reclaiming belt conveyor.

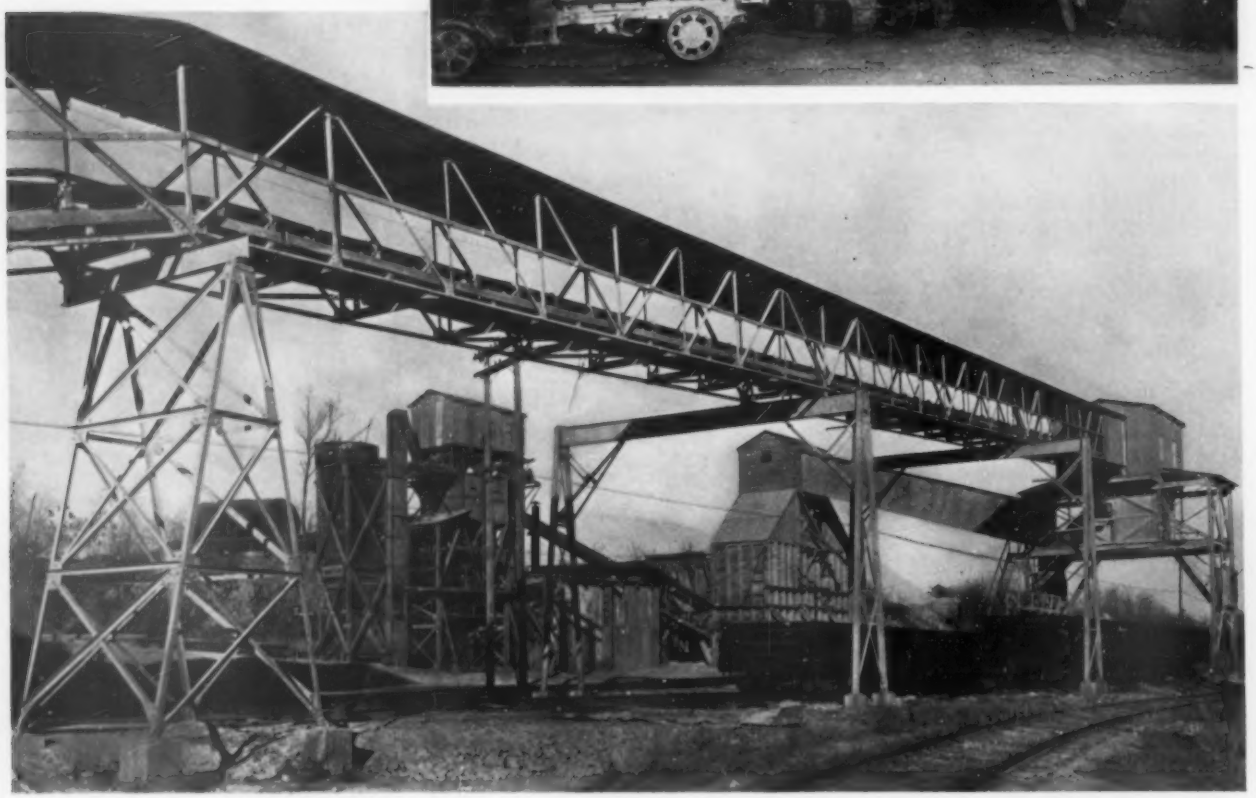
The market for crushed stone in the Kansas City area has been very "spotty," with respect to demands for particular stone sizes. However, as a result of successful efforts to find markets for stock-piled waste products, some of these "waste" products now must be produced. For example, the plant now produces a ½-in. to 3/8-in. stone (chat), for which there is quite a demand. Not so long ago, the problem was how to get rid of it.

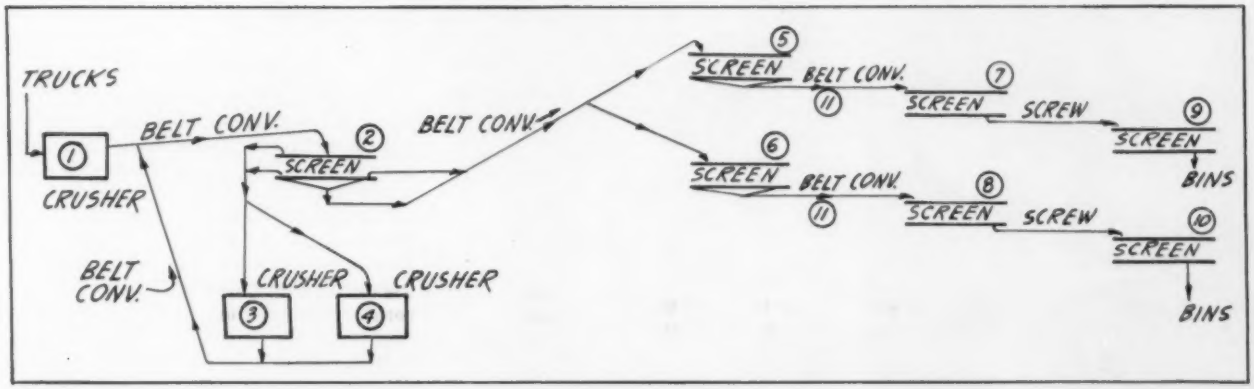
Improved plant facilities have provided the flexibility to meet the situation previously mentioned and any other conditions. The plant now has a screening capacity in excess of 200 tons per hour when producing as many as a dozen stone sizes. This is double the capacity before the screen changes were made. There are six sizing screens as before, but double-deck, 3½- x 12-ft. screens replace smaller single-deck screens having considerably less screening surface. To best describe how the new screens have fitted into the plant operation, it is necessary to trace the flow of stone through the plant, starting with the primary crusher.

Stone is trucked from the mines to a

Shovel operations in the mine operated by Stewart Sand & Material Co., from which stone is obtained for crushing

Below: Loading out conveyor, tower, retail bins, and asphalt plant





hopper and fed by a Ross chain feeder to a No. 8 Austin gyratory crusher. From the primary breaker, the stone is carried by a 30-in. belt conveyor, on 120-ft. centers, to a 4- x 12-ft. double-deck vibrating scalping screen. The screen has 2¼-in. square openings on the top deck, and 1⅞-in. square openings on the bottom deck. In fact, all screens in the plant have square openings.

Stone retained on either deck may be chuted to either of two reduction crushers, a 3-ft. cone or a 6-in. crusher. Throughs from the scalping screen travel to the screening plant above, or that which is retained on the lower deck may by-pass the secondary crushers.

After recrushing, a 24-in. belt conveyor, 70-ft. centers, places the stone back on the belt conveyor, 120-ft. centers, leading from the primary crusher, to return the material to the scalper.

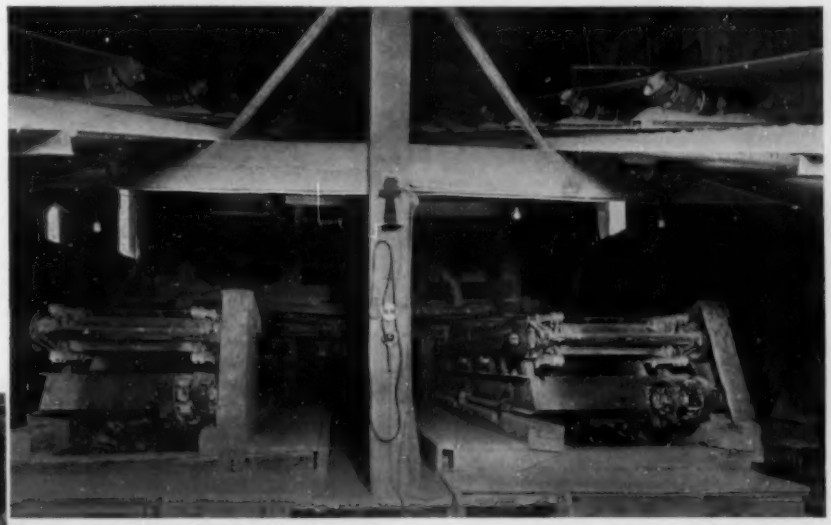
Key to Flow Sheet

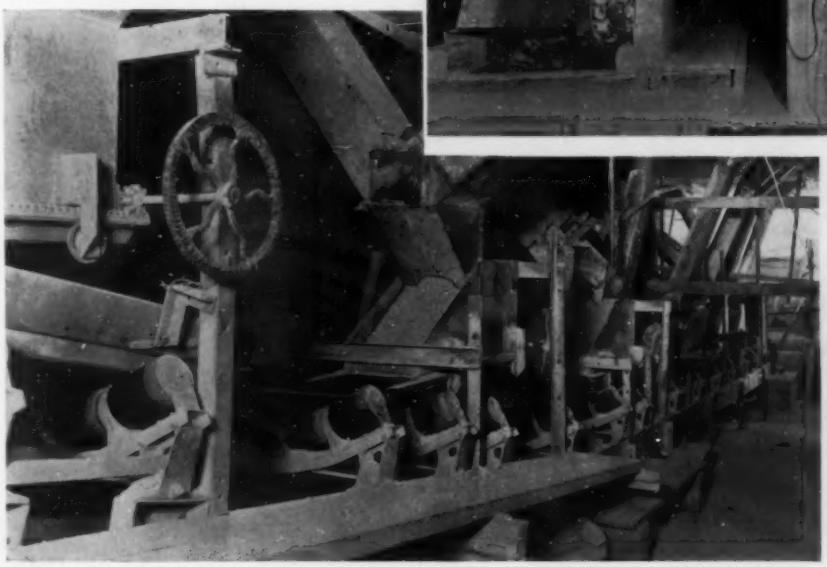
(1) Austin No. 8 gyratory crusher
(2) Robins 4- x 12-ft. double-deck scalping screen. Oversize to (3) and (4), throughs to screening plant
(3) Symons 3-ft. crusher
(4) McCully 6-in. crusher. Load circulated over scalper
(5) and (6) Allis-Chalmers double-deck vibrating screens. Load split and ballast sized out
(7) and (8) Symons 3½- x 12-ft. double-deck screens
(9) Symons 3½- x 12-ft. double-deck screens
(10) Two 3½- x 6-ft. Robins Gyrex double-deck screens joined to make one 3½- x 12-ft. double-deck screen
(11) Link-Belt conveyors, 12-in. x 14-ft.

The circulating load generally averages about 325 tons of stone per hour.

Stone passing through the scalping screen or that which is allowed to by-pass is elevated over a 24-in. belt conveyor, 115-ft. centers, to the screening plant above where the load is split, each side of the screening plant being the exact duplicate of the other from this point on. A gate in the chute, splitting the load, may divert all stone to either side of the screening plant.

Generally, however, the load is divided to two 4- x 8-ft. vibrating screens with





Right: New 3½- x 12-ft. double-deck horizontal vibrating screens. Below: Reclaiming belt conveyor beneath the storage bins. This installation is used to accurately blend sizings of aggregates from bins to a loading out conveyor, and to give flexibility in meeting specifications

1¼-in. and 1-in. openings. At this point, the ballast is taken out and passed to bins, the larger stone from the scalping screen is allowed to pass to the screening plant, and the 1- to 1¼-in. stone is screened out.

Minus 1-in. stone is carried over two 24-in. belt conveyors, 55-ft. centers, to new 3½- x 12-ft. double-deck horizontal vibrating screens (one on each side of the plant), with ¾-in. and ½-in. screen openings on the top and bottom decks, respectively. The ½- to ¾-in., and the 1- to ¾-in. stone go to bins and the minus ½-in. stone is fed to the feed box for the top deck of the following screens by two 12-in. screw conveyors

Chain feeder installation ahead of large gyratory crusher

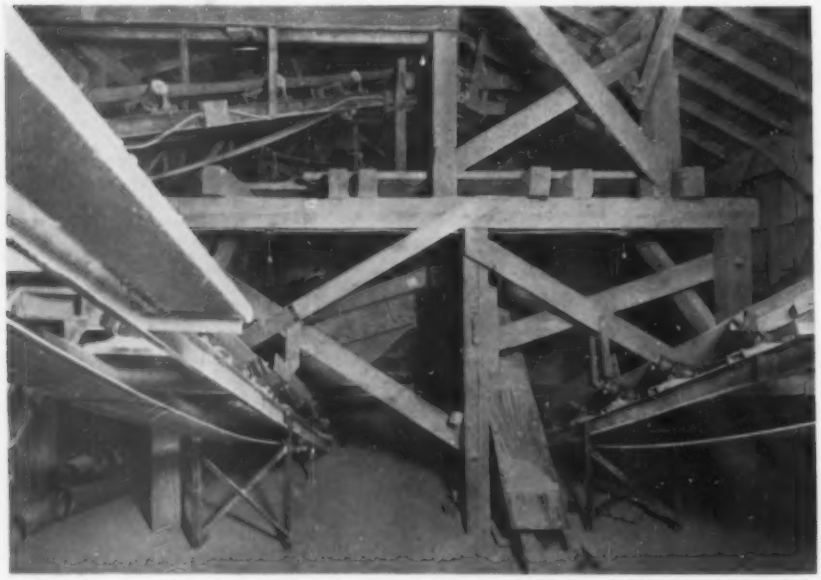
14-ft. long. One of these screens is a new 3½- x 12-ft. horizontal double-deck screen, and the other a 3½- x 12-ft. double-deck screen, made from two 3½- x 6-ft. screens joined together. The top decks of these two screens have either 5/16-, ¼- or ⅜-in. openings, and the bottom decks have three cloth screens, 28-mesh, 10-mesh and ⅛-in., for three dust sizings. The screen openings on the preceding screens, of course, may be varied to meet conditions. For example, a typical screen arrangement will produce, 1½- to 2¼-in., 1- to 1¼-in., 1- to ¾, ¾- to ⅝, ⅝- to ½, ½- to 5/16, ½- to ¼, 5/16- to ⅛, ¼- to ⅛, minus 10 mesh (aglime), minus 28 mesh (aglime in sacks) and minus ⅛-in. plus 10 mesh stone sizes to meet any specification.

The addition of four bins of 1000 tons combined capacity has increased the total live storage capacity of the plant to 2100 tons in 18 bins. Bins are arranged in two rows, with each screen being placed over a bin. Below the bins, the loading-out belt conveyor has been extended under the four additional bins and new chutes installed so that any combination or blending can be done by drawing stone from any of the 18 bins on a single belt conveyor. The 36-in. loading-out belt conveyor on 360-ft. centers, carries stone to the railroad loading tipple and truck loading bins. Stone sizes in the several bins are fed to the loading-out belt conveyor through an accurately calibrated gate feeder so that exact grading specifications may be maintained on the loading-out belt conveyor. A final vibrating screen in the loading-out tower removes any casual dust from materials loaded in cars or sent to retail bins.

This interesting combination of close screen sizing and blending from all bins offers a challenge to any specification.

IRON TRAP ROCK CO. Woonsocket, R. I., has resumed operations after a shut-down of two years. A new corporation, the East Woonsocket Trap Rock Co., Inc., has been formed which holds a lease on the land, buildings, crushing equipment, rock, shovels, and other equipment of the Iron Trap Rock Co. Frederick Pelletier is president.

GRANITE STONE producers in New England have opened a campaign against tariff regulations which they claim permits granite from Finland to compete with domestic stone.



Load is divided between two 4- x 8-ft. vibrating screens with 1¼-in. and 1-in. openings. At this point, the ballast is taken out and passed to bins, when larger stone from the scalping screen is allowed to pass to the screening plant, and the 1- to 1¼-in. stone is screened out

Mineral Wool

(*Continued from page 37*)

Various angles of blowing steam jet or compressed air against the slag stream are used, but the conventional angle is always somewhat acute in that the slag drops vertically and the steam jet or air is usually directed upward to as much as 30 deg. above the horizontal.

Shot-free wool is very much desired, but none of the plants are able to entirely eliminate the shot. Glass wool made with a reverberatory furnace is the closest approach to it, but in the manufacture of rock or slag wool in a cupola furnace, shot is a waste product with which all producers have to contend. It is believed that the production of shot is caused by the globule cooling in its passage through the air before it has been entirely converted into fiber. Two remedies are suggested; one to manipulate the blowing operation so smaller globules will be made, and the other to raise the speed of the particle by increased steam pressure. Raw wool contains from 15 to 50 percent shot, ranging from microscopic size to ⅛-in. or more in diameter. It is difficult to remove the shot without breaking the fibers, but experiments are now being made which it is believed will result in the production of relatively shot-free wool. The manufacture of granulated wool eliminates the shot by passing the raw wool through hammer mills, feed threshers, or other types of granulators and then screening, but the fibers are broken up.

Customer Specifications

There is a definite trend toward the manufacture of a product which will meet certain specifications. The following have been mentioned as probable factors to be covered by specification: chemical composition, shot content, fiber size, ductility or softness, waterproofing, and thermal conductivity.

It is reported that mineral wool in which the percentage content of lime is too high, slowly disintegrates under atmospheric conditions. If the sulphur in the wool is in the form of sulphite or sulphate no corrosive action is noticeable, but if sufficient air is present to assure oxidizing conditions in the cupola, sulphur may appear as a sulphide which is unstable in the presence of moisture. Acid formed from the combination of sulphides and moisture is corrosive and harmful. Excessive shot content is not desirable because the shot has no insulating value. Wool of small diameter fiber has greater insulating value, and the longer fiber is desirable because it gives a better supporting bond. Ductility or softness is of value as it makes the wool easier to shape.

Some "Short Cuts" In

GYPSUM MINE and PLASTER MILL

By L. W. SMITH

President, Fort Dodge Gypsum Co., and Fort Dodge Plaster Co.
Fort Dodge, Iowa

WHILE IT IS NOT LARGE AS PLASTER PLANTS go and does not feature automatic precision control and regulation of practically every step in production, the industry's newest plaster mill does manufacture a good product largely through the use of an excellent base rock, close supervision, and frequent testing. This plant, owned and operated by the Fort Dodge Plaster Co., is situated in "gypsum hollow" and curiously enough on the very spot where the Cardiff giant came into being years ago.

The plaster plant was built in the valley on the right-of-way of the Fort Dodge, Des Moines & Southern Railroad where its bins can be economically loaded from the bin of the Fort Dodge Gypsum Co. crushing plant on the bluff above. The latter concern has been mining and crushing gypsum rock for about five years, mainly shipping rock direct to cement mills.

High grade rock is being mined by the Fort Dodge Gypsum Co., from a 42-ft. stratum. It is a typical slope mine into the hill, and is being worked by the room-and-pillar system to a height of 18 to 20 ft. Rooms and entries are 30 ft. in width.

Rock is broken from the face, in any room, by shooting horizontal drill holes, usually extending nine feet into the face. Drilling is done by electric drills and from 15 to 18, 2½-in. diameter holes are loaded with seven sticks of gypsum A dynamite for a single shooting.

A shot is designed to bring down about 100 tons of rock. Large rock are handsledged to a maximum weight of 150 lb., and mine cars are hauled to the main entry by mules. Two-ton cars on 36-in. gauge track are hauled in pairs out of the mine and over the crusher by a Hardsocg 48- x 18-in. single-drum hoist.

All stone is reduced to minus 1½-in. through a single-roll crusher, and is elevated over a bucket elevator, 60-ft. centers, to a 4- x 8-ft. single-deck mechanically-vibrated screen. Stone retained on the 1¼-in. square openings returns to the crusher, and is re-circulated over the screen. Screenings are separated from the screen throughs by passing them over a stationary screen pitched at 50-deg. Thirty tons storage is provided for top sizings and 250 tons for screenings.

The plant is on the bluff above the railroad and chutes gypsum rock directly into cars or into the bins of the Fort Dodge Plaster Co. Delivery of rock to either of these two points is done very economically by means of a "home-made" haulage system, consisting of an old model truck operated over standard gauge railroad track. Regulation railroad car wheels have been placed on the axles in place of rubber tires. The transmission gears in the truck have been interchanged to give four speeds in reverse and two in a forward direction. This change in the transmission was made as the truck backs out from

Above: Two-ton cars on 36-in. gauge track are hauled in pairs out of the mine and over a crusher by a cable and single drum hoist. Right: Crushed gypsum rock is hauled by an old model truck over standard gauge track to be loaded into railroad freight cars or to chutes leading to bins of the plaster mill

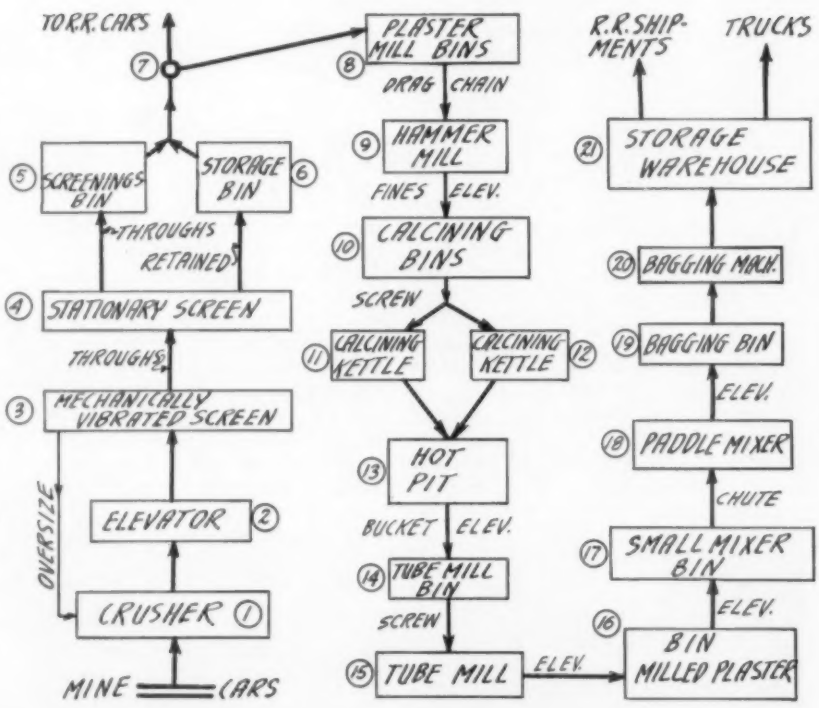
Below: Plaster mill located in the valley to utilize gravity in moving gypsum rock from the mine to the mill

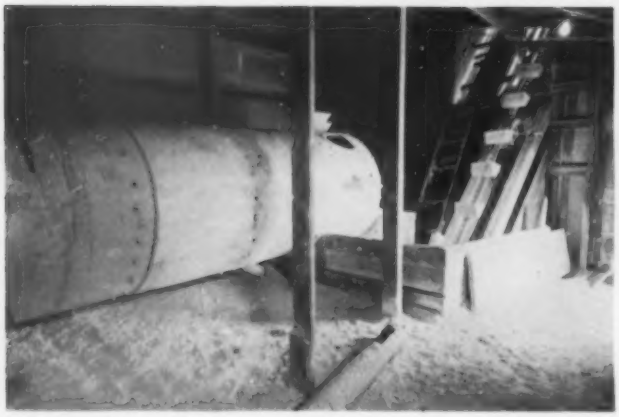
the bins to either point of unloading, and the reverse gears are used more than the forward gears. The plant capacity of 300 tons of crushed gypsum rock daily does not justify a powered locomotive, and the truck as remodeled saves the expense of building a truck road through the woods. About 300 tons of rock are hauled an average of 500 ft. in an 8-hr. day using just four gallons of gasoline.

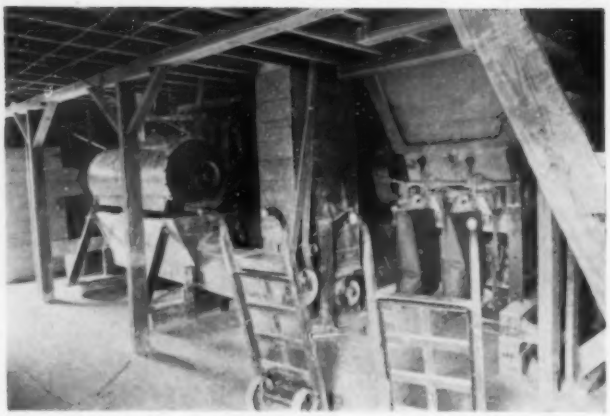
Key to Flow Sheet

(1) McLanahan and Stone, 42- x 18-in. single-roll crusher
(2) Jeffrey bucket elevator, 60-ft. centers
(3) Universal 4- x 8-ft. single-deck mechanically vibrated screen
(4) Pitched gravity screen to remove fines
(5) 30-ton storage bin
(6) 250-ton storage bin for screenings
(7) 120-ton bin
(8) 120-ton bin (plaster mill)
(9) Jeffrey, 24- x 36-in. grate type hammer mill
(10) 40-mesh product in 20-ton bin
(11) and (12) J. B. Ehrsam 15-ton batch calcining kettles
(13) "Stucco" pit
(14) 30-ton bin
(15) Peripheral discharge mill, 5- x 20-ft., 12-ton hourly capacity
(16) 60-ton bin
(17) 10-ton bin
(18) Mixer for plaster, retarder and other ingredients
(19) Small hopper
(20) Bates 2-spout bagging machine
(21) Storage for sacked product

Flow Sheet From Mine to Finished Plaster







Upper left: Hammer mill for reducing rock to 40-mesh size before calcination. Center: L. W. Smith, president, left, and a workman. Upper right: Gypsum calcined in 15-ton batches in kettles. Lower left: Tube mill for pulverizing gypsum. Note peripheral end discharge. Lower right: Paddle-type mixer for mixing ingredients for various plasters, left, and bagging machine, right

Plaster Plant Utilizes Gravity for Haulage

The plaster plant is located and designed to utilize gravity to the fullest, and for truck or rail haul of the finished products. The capacity of this plant is about 120 tons of plaster products daily, including finish plaster, stucco, gauging plaster, white plaster, trowel finish plaster, molding plaster, fibre plasters, and Fort Dodge Tile cement, a plaster which is claimed to be similar in physical properties and applications to Keene's cement.

Rock, 3-in. and under in size, is dumped from the bins of the gypsum company into a 100-ton storage bin. A drag chain feeder draws the rock from storage to a 24- x 36-in. grate-type hammer mill. Here, about 15-tons of rock are pulverized per hour to pass the 40 mesh sieve. The crusher throughs are conveyed directly to a 20-ton calcining bin by a bucket elevator on 45-ft. centers.

Stone is placed into the calcining kettles by a screw conveyor feeder below the calcining bin. Calcination takes place in two 15-ton coal-fired, calcining kettles. To insure complete and thorough calcination, each batch is calcined a minimum of 2½-hr. in the kettles at a temperature of 280-deg. F. to 335-deg. F. before drawing.

Each batch is tested for water and sand holding content and uniformity of the product before it is discharged into the hot pit. The kettles have a 16-ft. base, an 18-in. firewall, and an 18-in. combustion chamber for efficient burning and to reduce the radiated heat loss.

From the hot pit the "stucco" is placed in a 30-ton tube mill bin by a bucket elevator on 36-ft. centers. From this bin, the calcined gypsum is fed to the tube mill by a spiral conveyor.

The 5- x 20-ft. tube mill, charged with one ton of mixed ½- to 1½-in. grinding slugs, is "home-made" and is designed for peripheral rather than center discharge. Flow of "stucco" through the mill is continuous, and the mill is always empty after a run, since it is not necessary to build up a bed of material and grinding media before the pulverized product may discharge. The mill has a capacity of 12 tons of plaster per hour, all passing the 300-mesh sieve. All pulverizing takes place in the first third of the mill, which is driven by a 50-hp. motor through a herring-bone gear drive.

Production of the tube mill is placed in a 60-ton bin over the warehouse by an elevator on 45-ft. centers, and is carried from this bin by another elevator on 40-ft. centers to a 12-sack weighing hopper where the hair retarder and other ingredients for various products are proportioned. The weighing hopper discharges into a 10-ton mixer bin which feeds a paddle-type mixer. A short elevator places the finished plaster in a hopper serving a two-spout bagging machine. Company officers are: L. W. Smith, president, secretary and general manager of both concerns; and Joe Bedow is vice-president; and Doris Butts treasurer, of the Fort Dodge Plaster Co.

Unfair Comparison of Gypsum Prices

AT A RECENT stockholders' meeting of United States Gypsum Co., Sewell L. Avery, chairman, in commenting on a statement by President Roosevelt that plaster prices were double 1929 levels, pointed out that in 1927 a price war broke out in the South which spread throughout the country and continued through 1929. As a result, the market was disrupted and at certain points prices were as low as $2 a ton, sacked, loaded and ready for transportation. Consequently 1929 prices, mentioned by the President, were absurdly out of line, and as soon as the price war was terminated, quotations returned quickly to approximately the 1927 level. The further price rise in 1934-1935, Mr. Avery pointed out, was due entirely to the NRA, and since the elimination of the NRA, prices drifted downward and are presently about in line with 1927.

Referring to present prices, he said that the average prices of all products sold by his company during 1937 were 9 percent lower than 1926 prices. At the same time, the average cost of products sold increased 3 percent. The unit cost of selling increased 1 percent of the sales price. However, the cost of purchased materials entering into the products increased 9.5 percent. Hourly wage rates increased an average of 18 percent. The company paid its employes in 1937, $11,603,250, compared with $9,054,243 in 1936, an increase of $2,549,007, or 28.2 percent. Social-security taxes for old-age pensions and unemployment cost the company $83,527 in 1936, $318,224 in 1937, and are estimated at $400,000 for 1938, due to an increase in the unemployment rate. In spite of these additions to cost, the company reported an increase of 1.7 percent in net profit.

It is interesting to note that practically all rock products industries' prices were down to a low level in 1929. Building had started to taper off in 1926, but productive capacity of cement plants and other industrial mineral industries was being continually increased. This led inevitably to price cutting.

OKLAHOMA CITY, OKLA., is proposing to spend $100,000 on a lime plant to manufacture lime from the waste sludge of the city waterworks filtration plant. The city is now a consumer of about $30,000 worth of lime annually. The possibility of drying this sludge and using it for agricultural purposes apparently has never occurred to the city fathers.

—Courtesy of *Chicago Tribune*

Chart showing how President Roosevelt misinterpreted the actual situation when he said present plaster prices were double those that were in effect in 1929

Tube Mill Liners That Classify Media Promote

GRINDING in the CEMENT INDUSTRY

By C. L. CARMAN,
Independence, Kansas

THE CHARGE in a conventional tube mill is an assortment of all ball sizes from that of the original make-up down to and including some that can, but do not, pass through the discharge screen. Therefore, each cubic foot of mill load is practically identical in assortment and number of balls. The illustration, Fig. 1, is of a model of this type of mill and shows its characteristic ball distribution.

As the particles of the feed increase in number as they are reduced in size during their progress through the mill, it is obvious that a fixed number of balls per cubic foot can be efficient only up to a certain point in the mill length, where they are greatly out-numbered by the particles, and where their effectiveness decreases to practically zero. The remedy is to increase their number per cubic foot in the same ratio, if possible, as the number of particles increases. This can be accomplished only by decreasing the ball sizes progressively, to maintain the optimum ball particle ratio at each point in the mill length.

As this is impossible in an ordinary single-compartment mill, the efforts to do so have been restricted, so far, to dividing the mill into two or more compartments and charging each compartment with progressively smaller balls, adapted as near as possible in size to the mean particle size in that section of the mill. As each compartment is in effect but a relatively short tube mill, there is less terminal difference in the particle sizes. This admits of a closer adaptation of the charge to the *mean* optimum ball-particle ratio. It follows, therefore, that the shorter the compartments are, the nearer the whole mill approaches the condition of complete classification of the charge, and

Fig. 9: View of mill fitted with frustrum liner as it appears through discharge end manhole

accounts for the greater relative efficiency of multi-compartment over the conventional types of tube mills.

However, very much greater efficiency is now obtained than with the early predecessors of this type of grinding unit, that came to us in the "Stone Age" paved with rock and filled with flint pebbles. This tube mill was originally called a "grit mill", and supposed to grind by attrition, which can only occur by a relative movement of the individual units of the charge while in mass contact with each other. Very little such movement of the charge actually occurs in a tube mill operating at the most efficient speed. The best example of grinding by attrition is with a pair of mill stones.

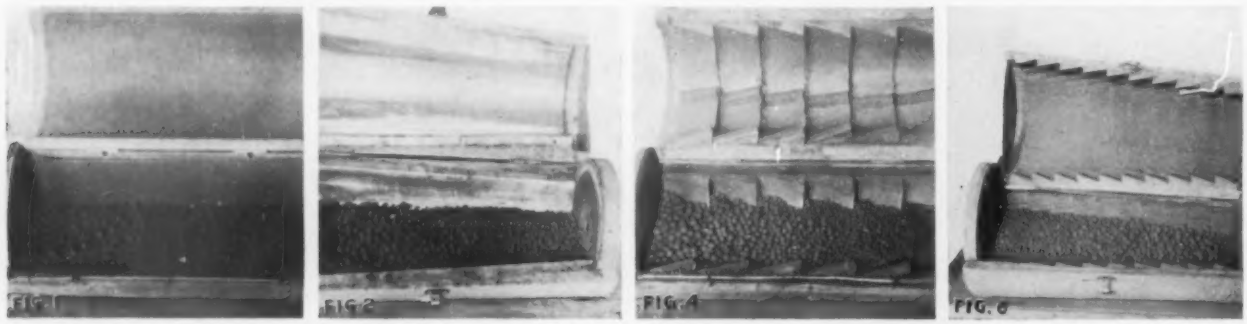
Conical Linings

Many years ago the writer experimented with a then, new type of mill whose shape was that of a frustrum of a cone—a tapered shell. This mill developed two decided characteristics. One was that it would classify the ball charge perfectly according to their relative sizes with the largest at the feed end, and, would pile them up there. The main thing the matter with it was that it classified the charge wrong end to, with the large balls in large end, and piled them above the normal level of the charge at the expense of the small balls in the small end.

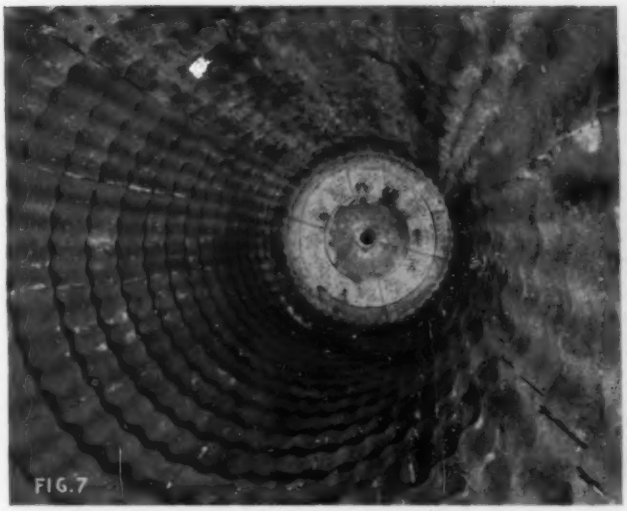
Of course, this experiment was a failure because the small balls in the small end could not possibly reduce the output of the large balls in the large end. Fig. 2 shows a model of this type of mill. Note the classification and difference of charge level at the ends.

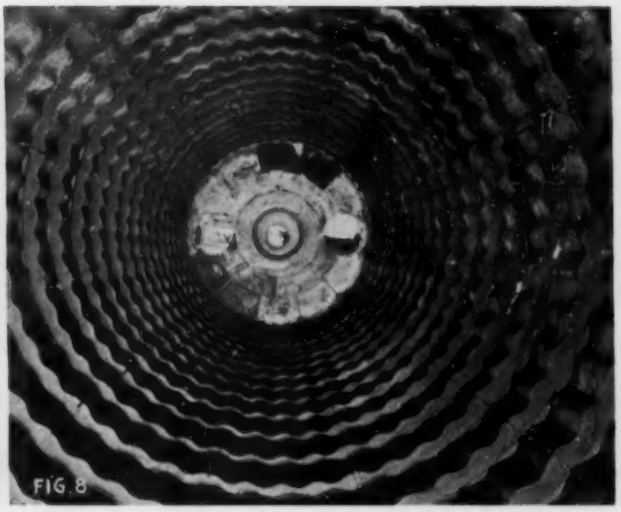
Since then the writer has been of the opinion that if some means were devised to automatically and continuously effect a ball classification in a cylindrical tube mill, that its efficiency could be raised to its highest point. Also, if the original charge and replacement balls could be placed in the mill through any manhole, and be located by classification, without the use of compartments, it would return the mill to its original simplicity.

The conventional tube-mill lining re-



From left to right: Fig. 1. Model showing ball distribution in conventional mill. Fig. 2. Plain frustrum mill, model 5- x 7- x 13-in. Fig. 4. Model with frustrum liner in cylinder. Fig. 6. Frustrum mill with reverse frustrum classifying liner





Left: Fig. 7. Eight-foot mill with classifying liner, looking toward screen end. Right: Mill with classifying liner, looking toward feed end

quires only extreme endurance and a "non-skid tread". As it has a more intimate association with the ball charge than any other part of the mill, the author decided to utilize it, without sacrificing either endurance or tread, to furnish the surface upon which the balls would classify themselves automatically according to their relative preponderance. Therefore, a few years ago he designed and patented a liner that formed a series of short frustrums, with the larger end of the frustrums placed toward the feed end of the tube mill. This construction is shown by the diagrammatical drawing, Fig. 3, of such a liner. Fig. 4 is a photograph of a model mill so lined.

That this liner will classify the ball charge of the tube mill according to the relative sizes of the balls, or their preponderance, throughout the length of the mill, with the largest balls at the feed end, grading them down in size to the smallest at the discharge end, and, if the screen openings are large enough to pass the useless small balls, keep the charge free of them, is not all a matter of conjecture, but of fact established by practical operation of several installations. Given such a classification what may be expected of it? Nothing may be expected of it, unless the ball sizes and volumes are optimum to the particles sizes at every point in the mill. At this time there is no literature, of which the author is aware, by which the various ball sizes may be determined in advance (for the initial charge) except, perhaps, by laying out a theoretical graph and determining the ball sizes from it by the formula given by Howard R. Stack in a paper entitled "A Study of Grinding in Ball Mills and Tube Mills", published in Rock Products, July, 1936.

The accompanying graph, Fig. 5, is of a preliminary run and shows the lack of some necessary sizes which will be supplied in due time when the mill is put in commission again. With the ball load properly proportioned as to sizes and volume, it will be found that this liner will increase the output or the fineness. This, also, is not a matter of conjecture.

The design of these liners is such that the mean inside diameter is approximately that of the lining it re-

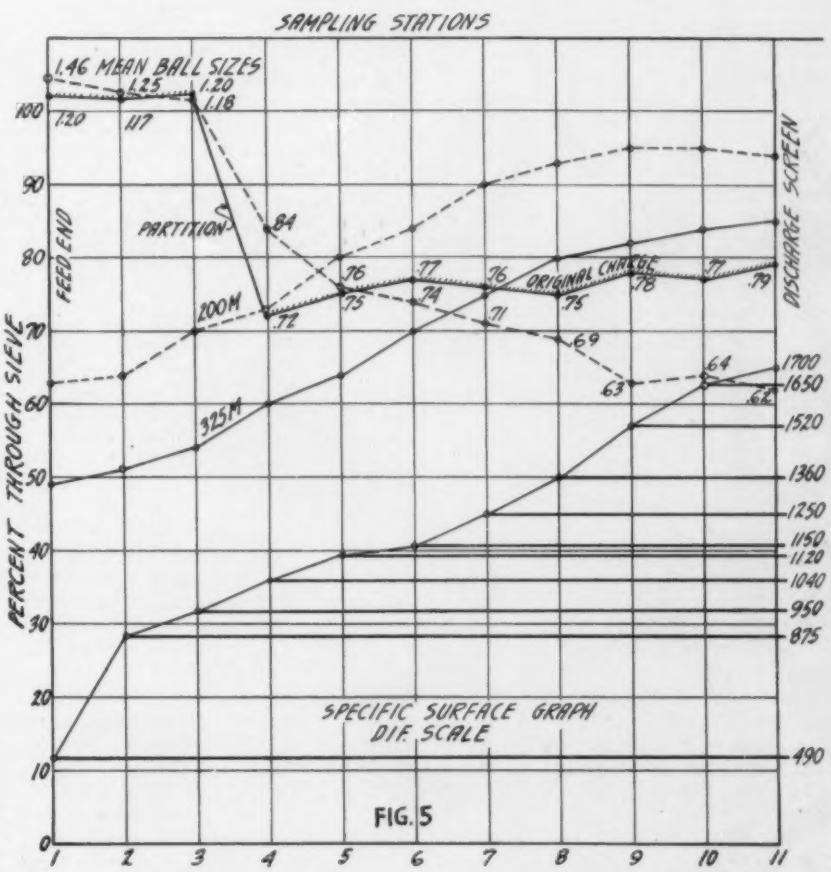


Fig. 5: Graph of a preliminary run with tube mill having new type liners. This preliminary run shows the lack of some necessary sizes of balls. With the ball load properly proportioned as to sizes and volume, it is expected that the new liner will increase the output or the fineness

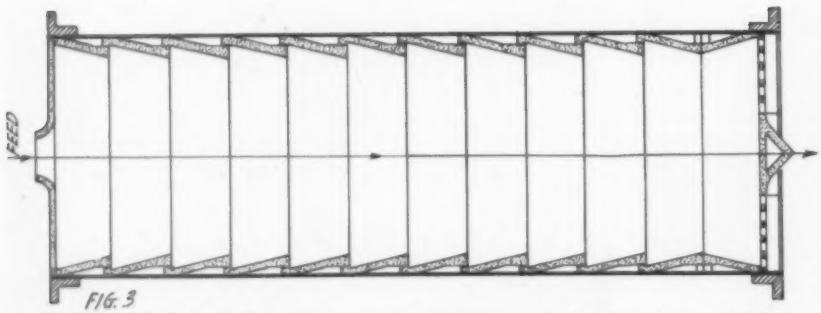


Fig. 3: Longitudinal section showing typical arrangement of classifying tube mill lining

places, in order that the working of the mill diameter may not be reduced.

In order to test the efficacy of the classification action of this type of liner, the smooth sheet iron liner of the model mill (Fig. 2) was removed, exposing the frustrum step liner, but inclined in the opposite direction to that of the tapered shell, i. e., toward the small end. The result is shown in Fig. 6. Note that the larger balls are in the small end and had to go up hill to get there. Fig. 7 is of a liner installed in an 8-ft. diameter mill looking toward the screen; Fig. 8, looking toward the feed end of the mill, and Fig. 9 was taken through the rear manhole.

Conclusions

The primary function of a conventional lining is that of protecting the mill shell, but this frustrum liner provides the same protection *plus* ball classification, which, of course, depends upon the presence in the charge of balls of *various* sizes. It will not produce a visible classification with balls all of one size. A classification will obtain nevertheless, as in no charge are the balls all of the same individual preponderance.

This liner is effective in wet or dry grinding, and in open- or closed-circuit systems, because the *relative* preponderance of the balls in the charge is an inherent property, whether in the bag, the mill or the scrap pile.

Suit Against Cement Plants Charges Monopoly

SIX TEXAS CEMENT producers have been sued in the state courts for alleged price-fixing violations. The companies were accused of entering into price fixing agreements under a "code of ethics" about January 3, 1929, when the Cement Institute, with headquarters in Chicago, was formed. Statutory penalties of $50 to $1500 daily against each of the defendants for 3348 days to March 7, 1938, were asked. It has been estimated that these penalties would amount to $30,000,000. The suit also asks for forfeiture of charters. The action taken by Attorney General William McGraw followed an inquiry by the Texas legislature into identical bids submitted by cement companies on public works.

Defendants named in the suit are the Lone Star Cement Corp., New York and Dallas; the Southwestern Portland Cement Co., Los Angeles and El Paso; Trinity Portland Cement Co., Chicago and Dallas; Universal Atlas Cement Co., Chicago and Dallas; Longhorn Portland Cement Co., San Antonio; and the San Antonio Portland Cement Co., San Antonio.

Rights Under Lease

APPROPRIATION proceedings were brought by the Muskingum Watershed Conservancy District under Section 11038, et seq., General Code, State of Ohio, against Cullan T. Funk and Abertha Funk, owners of a farm of 51 acres in Stark County, Ohio. The fee was subject to a sand and gravel lease in favor of William G. and Elmer E. Clementz, as partners. By virtue of the terms of the lease, the lessees could remove sand and gravel underlying or upon any 25 acres of the entire farm, except within 200 ft. of buildings, over a period of five years, on condition that they pay a royalty of two cents a ton on washed sand and gravel taken. The lessees were made parties in the original petition, but before trial the Conservancy District settled with the lessees, entering into an agreement subject to acquisition by the district of title to the premises, "excepting lessors' right to receive royalties" under the lease. The Conservancy district filed an amended petition against the owners only, seeking to appropriate all of their rights, title and interest in the premises, except their right to be paid for sand and gravel taken out during the term of their lease.

The jury, however, returned a verdict for the defendants in the sum of $32,000, upon which judgment was rendered in their favor. In affirming the judgment, the Court of Appeals held that if an owner of a farm which contains sand and gravel, gives to another by contract or lease an option to purchase an uncertain quantity of sand and gravel, at a price depending upon the quantity taken under the option, the sand and gravel in place belongs to the owner until severed from the property, and where the entire property is being appropriated the owner has a right to have the sand and gravel then in place taken into consideration in determining the market value of the property appropriated.

Pacific Coast Mills

CEMENT MILL PRODUCTION on the Pacific Northwest was at a low level in January, only 35,000 bbl. being produced, as compared with 212,000 in January, 1937, and 181,000 in January, 1935. However, California production during January was 695,000 bbl., compared with 877,000 in December and 1,005,000 bbl. in January, 1937. This is about 36 percent of capacity in California and 6 percent in Oregon and Washington for January. For the full year of 1937, California operations averaged 52 percent as compared with 59 percent in 1936, but the 1937 mill activity in Oregon and Washington was approximately 63 percent of capacity as compared with 55 percent in 1936.

Mill stocks of cement in California for January were drawn upon rather heavily as the inventory was 1,365,000 bbl., a reduction of 143,000 or 9.4 percent, indicating that shipments were greater than production. Pacific Northwest mills had an inventory of only 507,000 bbl., off 220,000 bbl. or 30 percent from the position a year ago.

Average mill values of cement in California for 1937 were close to $1.50 a barrel, as against $1.45 in 1936 and $1.40 in 1935. The Pacific Northwest average in 1937 was about $1.70, as compared with $1.65 in 1936, $1.90 in 1935, and approximately $2.10 in 1934.

Vicksburg Terminal

MARQUETTE CEMENT MANUFACTURING Co., will establish a new terminal at Vicksburg, Miss., costing about $250,000, according to an announcement made by President W. A. Wecker in an address before the company's sales organization at Memphis, Tenn. During the course of his address, Mr. Wecker said, "Memphis and the great lower Mississippi Valley section form an area in which there will be great industrial development during the next 20 years." Other officers attending the meeting included: Stuart Duncan, chairman of the board; R. Moyle, Sr., and D. S. Colburn, vice-presidents; F. L. Jaeger, general sales manager; and Henry W. Graupner, Southern sales manager, Memphis.

Plant of the Millwood Sand Co., Millwood, Ohio, which is now completely equipped for fine grinding of silica

Equip Plant to Eliminate Dust Hazard

PULVERIZING SILICA SAND

By D. M. WILHELM*

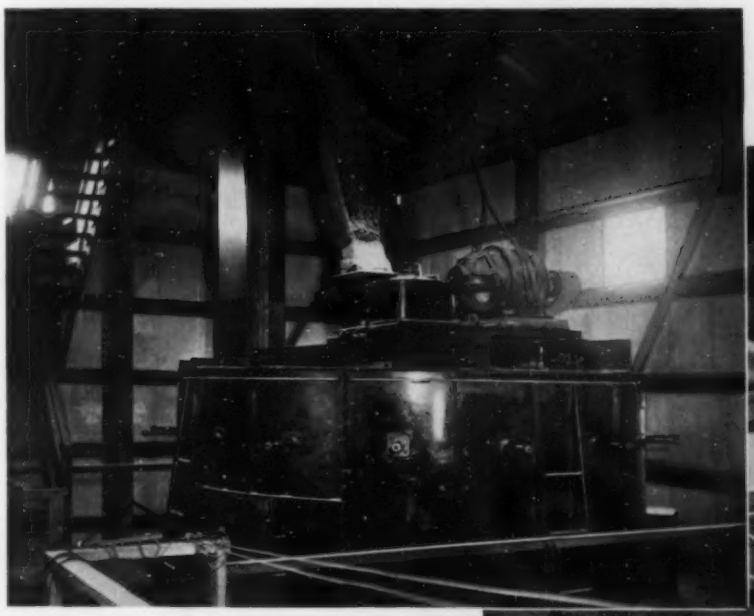
FOR A NUMBER OF YEARS the Millwood Sand Co., Zanesville, Ohio, has been operating a silica crushing plant at Millwood, Ohio. This company has several silica pulverizing plants at other points, and late in 1936 decided to install a fine grinding unit at its Millwood plant. It was decided that the plant should have a production of 3 to 4 tons per hour.

*Secretary, The Patterson Foundry & Machine Co., East Liverpool, Ohio.

This plant's production is used largely as a core wash in steel and iron foundries, the specifications for fineness varying from 80 percent through 200 mesh to 99 percent through 200 mesh, a fine uniform product being absolutely essential.

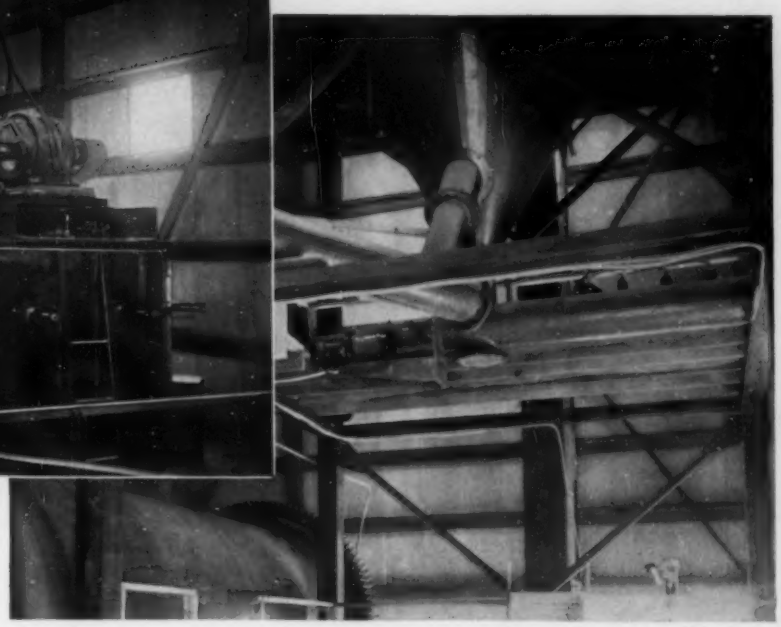
In the installation of a plant of this kind, it is essential that the design be sufficiently flexible to permit carrying various meshes, in order that the product may be used for many purposes. It is also essential that the plant be economical in production so that any mesh product may be produced at the lowest possible cost.

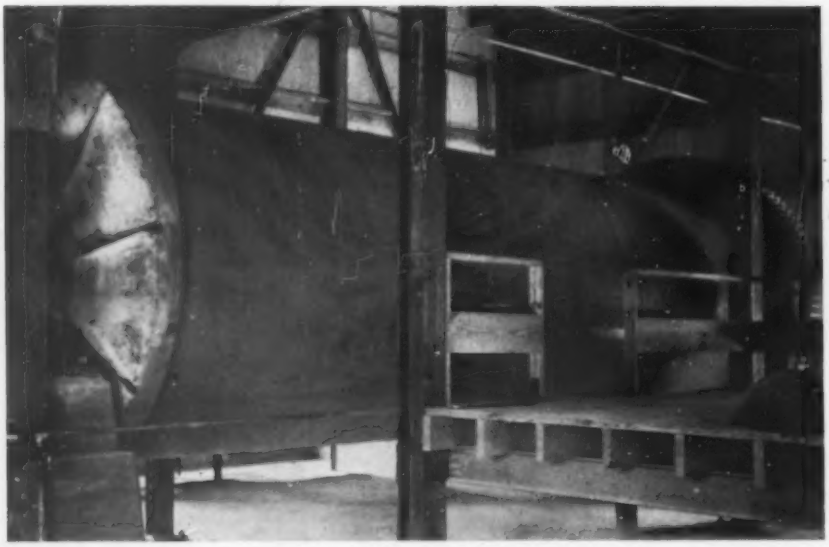
Silica dust presents a considerable hazard in most fine silica grinding plants, and it is not only desirable but absolutely necessary that this dust hazard be eliminated. In designing the Millwood plant, the engineers have been most successful in the entire elimination of this hazard. The raw



Above: Upper part of 12-ft. centrifugal air separator which is provided with dust seals to prevent the escape of fine dust

Below: Bottom cone of air separator, showing discharge to finished product carloader and also tailings return to tube mill





Continuous feed and discharge tube mill. Feed is taken into the mill through the scoop feeder and moved directly to the mill shaft

material comes from the company's pits near the plant, is crushed, chemically treated and then dried, and is conveyed to a 50-ton storage bin in the mill room, the silica received in this bin all passing 20 mesh.

The bin is supported sufficiently high so that the flow from the bin to the Patterson rotary feeder is by gravity. This feeder maintains definite volume, and discharges the material into the scoop feed hopper from which it is fed to the mill, a special dust seal making the feeding operation entirely dustless. Oversize returned from the separator is also brought into the feeder in this way.

Continuous Feed and Discharge Tube Mill

A 7- x 22-ft. continuous feed and discharge tube mill, driven by a 200 hp. wound motor type of motor, is used for grinding. A "V" belt drive is provided between the motor and the drive shaft of the mill, the shaft being of the three-bearing type, lubricated by grease. Main bearings of the mill are 28 in. in diameter and are of the water cooled type. The drive is on the discharge end of the mill.

Feed is taken into the mill through the scoop feeder and directly to the mill shaft. At the discharge end of the mill, a special hardened grid aids in maintaining pebble load to the center line and prevents discharge of the pebbles, and a special pebble screen prevents pebble chips from passing to the separator. The finished product is taken up a vertical elevator which discharges directly to a 12-ft. centrifugal air separator which is very easily adjusted to the desired fineness of finished product.

Tailings from the separator are handled by a screw conveyor which returns them automatically to the mill feeder. The finished product from the separator can be bagged directly or allowed to pass to the humidifier and the combined humidifier and carloader. In the humidifier just enough moisture is added to keep down the dust as the material is loaded into the car. The carloader permits the loading of box cars with a minimum amount of dust, the material being conveyed by the carloader to the extreme end of the cars and in this way cars can be loaded more fully than is possible by other methods. The uniform distribution of moisture makes the loading operation practically dustless.

Combined humidifier and carloader. In the humidifier just enough moisture is added to keep down the dust as the material is loaded into the car

The capacity of the grinding unit varies in proportion to the fineness of the material being ground. The plant will turn out 6000-lb. per hour of pulverized silica, 99 percent of which will pass 200 mesh or will grind 8000-lb. per hour to a fineness of 80 percent through 200 mesh.

Total connected horse power for mill, separator and all conveyors is 242-hp. Actual load tests on the complete plant show 136-kw. or 164-hp. This load is approximately the same on either 6000-lb. of 99 percent—200 mesh or 8000-lb. of 80 percent—200 mesh product. On a basis of capacity, 41-hp. hr. per ton of output or 34 kw.h. per ton is consumed when grinding 6000 lb. of 99 percent—200 mesh, or 55 hp. hr. per ton of output or 45 kw.h. per ton is consumed when grinding 8000 lb. of 80 percent—200 mesh which, with a rate of 2c per kw.h. for electric energy brings the power cost to 68c and 90c per ton, respectively.

The plant, being entirely automatic throughout, is very efficient in operation from the standpoint of labor, while maintenance cost is kept at a minimum figure.

New Silica Sand Mill

MOAPA MINERALS CO. has started on the construction of a new silica sand mill on the former site of the Moreledge-Veitch mill, near Overton, Nev. The old mill, which was destroyed by fire, will be replaced by one of the most modern in the West.

Talc Operations

CLINCHFIELD SAND AND FELDSPAR CO., Baltimore, Md., has started talc mining operations on the William H. Bower property near Murphy, N. C. It is generally believed that this section is rich in talc as one of the best veins in the country runs across the property. The new operations are on the same vein as that of the Carolina Talc Co.

NEVADA SILICA SAND CO., near Overton, Nev., has had an active season during the past year. Shipments have averaged about 40 carloads per month or more than 350 carloads of finished product during 1937. The product goes to manufacture of flint glass in both the Los Angeles and San Francisco areas, and is used chiefly for making bottles, jars and all clear glass containers. Serious competition is caused by importations of sand from Belgium caused by lowering the tariff.

Crane Operator Electrocuted By Contact With Trolley

LOOK OUT For "HOT" WIRES

INSTANT DEATH resulted recently when a crane operator in one of the cement mills took hold of an energized trolley wire without previously turning off the power. The crane, on which the accident occurred, spans the clinker pit, and is of the usual type with controls and master switch located in the cab, suspended below the bridge.

At the time of the accident, a helper was in the cab with the operator. The crane bucket refused to open and the operator remarked to the helper that one of the contact shoes, bearing on the trolley wires probably had loosened, allowing the wire to slip out of its contact groove. Apparently forgetting to open the master switch before leaving the cab, the operator climbed to the bridge, crossed it and leaning over the carriage rails, grasped one of the wires. He leaned in such a manner that he made a perfect "ground" with the rails.

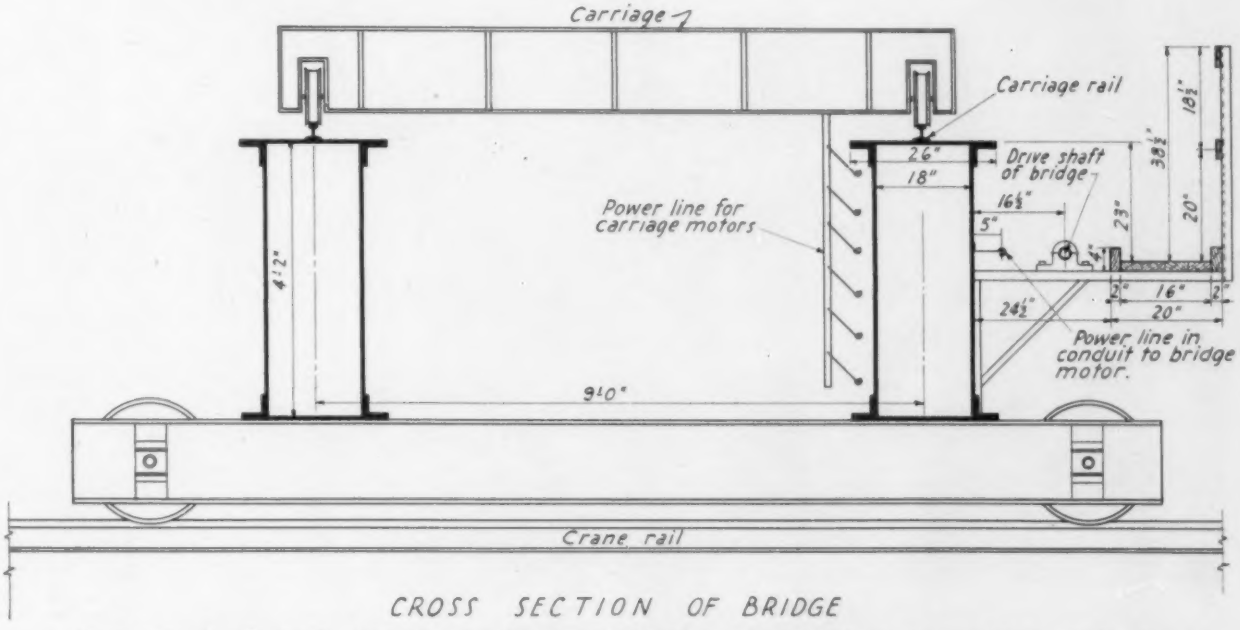
Artificial respiration was applied for 2½ hours and every known means used in an effort to revive the victim. He was a man in his early thirties who had been at work as crane operator for a year and a half. He was intelligent and cautious. He left a wife and three young children.

What lessons are to be gained from an accident of this kind? Let us consider some of the circumstances. First, there was a helper in the cab at the time. He was not a man of experience, just a beginner receiving instruction. But since the number one safety rule around a crane is to pull the safety switch before leaving the cab one would suspect that a new man would begin by learning this rule first. The helper understood from their reported conversation, why the operator was leaving the cab. Why did he fail to notice that the master switch was in, and to warn the operator accordingly? One can hardly imagine a helper in a crane cab so unmindful that he would not catch this situation, even in the absence of specific instructions covering this danger.

A SAFE RULE around electrical conductors and apparatus is to consider them charged unless there is unquestionable evidence that they are dead.

It has come to be common practice among many cement and other industrial plants to forbid crane operators to do any work in connection with the repair of electrical apparatus. This seems to be a sound regulation. When there is an electrical failure of any kind, or a noticeable defect in performance, the operator simply notifies the electrical department. This rule should apply, of course, to other electrical apparatus in the plant as well. Where it is in effect, no operator is expected to even investigate an electrical failure. Little time is lost in following such a rule as the electrical department is usually sent for eventually.

There is never any need for having the trolley wires energized except when the crane operator is in the cab. As they carry an element of potential danger it is better not to have them energized when the operator is away from his operating station. Therefore, it would seem logical to equip crane cabs with devices which would make it impossible to have the main switch in a closed position except with the cab door closed and the operator actually within cab, safeguarding against carelessness.



Cross section showing details of traveling crane which was involved in accidental death of crane operator by electrocution

Possibilities In New Crushed Stone Product

"BITUMINATED" or BITUMINIZED DUST

By HENRY O. FRAAD*

A PULVERIZED STONE PRODUCT which contains up to 20 percent of bituminous binder, (asphalt or tar) yet is dry and free running, certainly offers new fields and new opportunities to the crushed stone industry. Such a product is being manufactured in Switzerland and used in the construction of a considerable mileage of highways in difficult mountain country. These highways are subject to severe climatic conditions as well as motor traffic of all kinds, much of it using tire chains.

The stabilizing effect of very fine filler or bituminous mixtures has long been recognized. Some natural asphalts contain more than others. It is this very fine filler dust in Trinidad asphalt that accounts for some of its virtues. Mechanical difficulties have made it impossible to coat this fine dust with asphalt when it is added to asphalt paving mixtures. If the material is a natural rock asphalt, difficulty is experienced in pulverizing it to dust.

* Allied Pneumatic Services, Inc., New York City.

Dust Coated With Vaporized Bitumen

Dr. Albert Sommer, Zurich, Switzerland, has developed a method by which it is now possible to precipitate bitumen on finely powdered mineral in a state of such dispersion that the pulverulent form remains unchanged. The mixing is accomplished by atomization. Both components are carried and suspended in compressed air, forming clouds which are intermingled by pneumatic agitation. The liquefied bitumen is atomized by special nozzles which discharge directly into the dust cloud. The structure and appearance of these mixtures does not differ to a great extent from the untreated mineral, i. e., the raw filler. The size of grains is almost unchanged and the color differs but very little, even if the bitumen content is considerable. This fact proves that the asphalt is precipitated on these materials in such minute dispersion that its presence is hardly revealed. Under the ordinary microscope it is very difficult, if not impossible, to detect any particles of bitumen.

By means of such a filler it is possible to eliminate "free" bitumen in a pavement mixture. Instead of a liquid bitumen or tar there may be added a bituminated filler in which the asphalt is precipitated on the dust particles in the finest possible division. Essential modifications of pavement construction methods and apparatus are not necessary. The methods of construction remain the same; however, by adding the bitumen in the form of bituminated filler, the maximum of the mentioned effect is attained. A road built according to this principle, if properly applied, neither shows deformation by internal movements nor can bitumen rise to the surface, as free and fusible pitch no

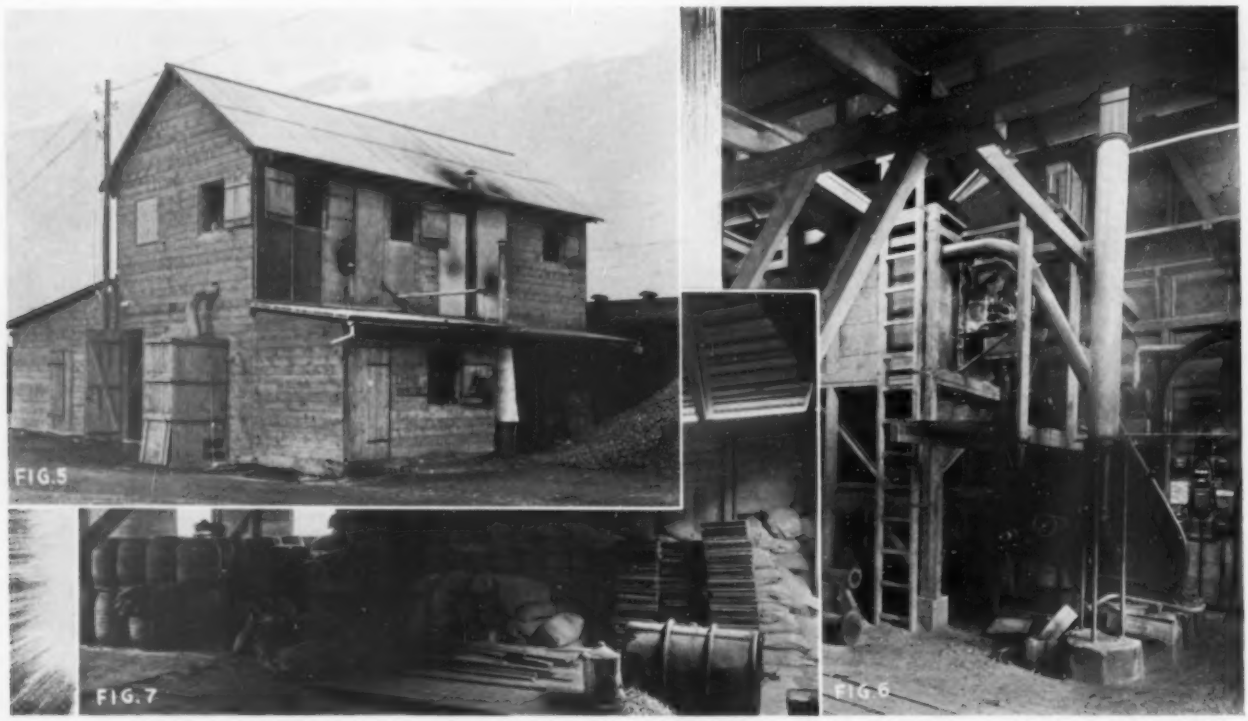


Fig. 5. Bituminated filler plant set up to supply material for 3000 sq. yd. of road construction per day on Julier road project, with the Alps in the background. Fig. 6. Mixing bin with bitumen injector nozzles and blower used in producing bituminated filler. Fig. 7. Bituminated filler may be stored, production going on during inclement weather, for use in the summer

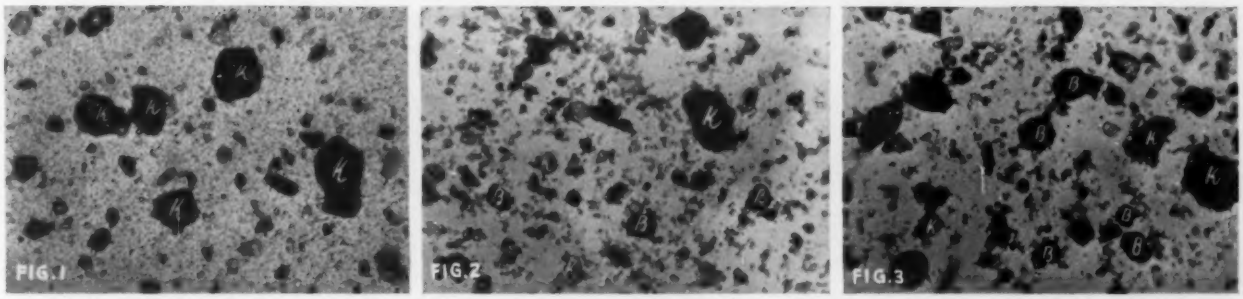


Fig. 1. Micro-photograph, enlargement 200 times with natural light, showing Test No. 1, raw filler untreated (K represents fragments of limestone and lime marl, M indicates finest limestone dust). Fig. 2. Test No. 2, polarized light, showing filler same as Test No. 1, but 12.2 percent bituminated. Note bitumen particles are very small, have globular shape and are entirely enveloped in finest limestone dust (K, fragments of limestone and lime marl, M indicates finest limestone dust). Fig. 2. Test No. 2, polarizedlight, filler same as in Test No. 1, but bituminated 11.2 percent. All bitumen particles have globular shape and are entirely enveloped in finest limestone dust. The filler still contains much limestone dust free from bitumen (K, indicates fragments of limestone and lime marl, B, bitumen particles enveloped in limestone dust

longer exists in such an aggregate. The surface of such a road remains not only even, but also permanently rough, thereby arresting skidding.

In 1933 and 1934 extensive laboratory tests were conducted in Switzerland with bituminated filler, to ascertain stability and wearability under circular track test conditions. The results of these tests conveyed convincing evidence to the Swiss officials that the process had exceptional merit.

In 1935 sizeable areas of test sections were constructed in several parts of Switzerland to study the resistance to extreme climatic conditions, tire chains, and tractor traffic. Although these sections were not all built to the same specification and not all with equal skill, no failure whatsoever was observed, notwithstanding the fact that the locations were in altitudes varying from 1200 to 9000 ft. above sea level, where thermal fluctuation was erratic. As a result of these tests and trials, a considerable and ever-extending mileage is being built by this bituminated filler principle in Switzerland and elsewhere.

Construction Methods

No standard specification for the use and proportioning of the content of bituminated filler has been followed. In the construction of the road over Julier Pass, which involves approximately 1,400,000 sq. m., and extends from the Italian border to Chur, embracing a program which started in 1936, and will end in 1940, the following procedure is used: Coarse aggregate up to ⅜-in. is coated or primed with a very small amount of tar in the ordinary way. Then the necessary quantity of asphalt is added in the form of bituminated filler (bitumen content, 10 to 12 percent). The mixtures produced show an extremely high density (much denser than the Topeka mixture) containing about 6 percent total binder. According to tests conducted, this layer has only 4 percent of voids. The compressed thickness of the top course is about 3 cm. One square meter weighs about 76 kilograms, whereas a normal tar concrete weighs approximately only 54 kilograms. In this remote Alpine locality the topography makes it necessary for traffic to use the right-of-way while construction is in progress.

In the Canton of Grissons, the mixture used is composed of the following components measured by volume:

Coarse Aggregate (crushed stone)	23 percent	5 to 8 millimeters
	19 percent	3 to 5 millimeters
	36 percent	1 to 3 millimeters
Natural pit sand	22 percent	0 to 1 millimeter
Bituminated filler	25 percent	(Bitumen content 10 percent)

Another specification for mixing which is quite widely used is composed of 75 parts (by weight) of coarse aggregate, 0 to ⅜-in., to which is added 25 parts (by weight) of bituminated filler (25 percent bitumen content).

Characteristics of Mixtures

The mixtures made with bituminated filler have the following characteristics:

a) The consumption of bituminous binder is smaller when bituminated filler is used.

b) The relative cohesive power of the binder is increased owing to its smaller percentage.

c) Possibility of use of large amounts of filler in an active form to fill the interstices.

d) Enormous density of the compressed mixture combined with a considerable degree of plasticity.

Fig. 4. Cross section of road constructed with bituminated filler

e) Greater and permanent roughness (non-skid) in comparison to covers constructed according to former methods.

Experience on this work has shown that the quantity of bitumen may be essentially reduced as against the old process with a similar density, aside from the fact that it would not be possible to succeed in incorporating such high amounts of filler (about 25 percent) in the structures heretofore produced. Moreover, it has been proven that the combination of tar and asphalt may be applied in any proportion, and that not only very dense coating may easily be obtained, but that construction can go on under the most unfavorable circumstances of weather and in traffic.

By means of the new process a material equal or even superior to rock asphalt can be produced. In this latter substance, nature has provided for asphalt and limestone particles to be deposited simultaneously in the ocean and petrified together in the course of geological periods, the distribution of asphalt within the stone being extremely fine. The new process makes it possible to duplicate this development at least as far as the distribution of the bitumen is concerned, and even to improve on it since, in the manufactured product, one is quite independent about the selection of components and their relative proportions.

As mentioned above, it is possible to make road mixtures solely with crushed stone and bituminated filler. Trials made with such "dry" materials gave good results, especially for maintenance and repair work. Experience has also shown that it is possible to obtain, in an economical way, thin and very dense layers which are equivalent to asphalt

mastic with a minimum of bituminous binder. As regards the nature and consistency of the asphalt incorporated in the filler, many varieties have been tried, using asphaltic bitumen as well as tar products.

There are the following possibilities of development:

(1) By the introduction of bitumen in its most dispersed phase, upon mineral dust, new methods of bituminous road building will be available, which may reduce or eliminate certain deficiencies of present bituminous roads.

(2) It will be possible to apply the "minimum of binding medium" which was long sought for in bituminous construction.

(3) It will be possible to use domestic materials (local tar, bitumen, etc.) in any proportion.

(4) Materials, up to now of little or no use, such as rock dust, can be turned into products ideally suitable for road building.

(5) Comparatively thin carpets of great density which will replace bituminous surface treatments can be laid on all types of pavements.

(6) Repairs, especially in winter, will be rendered easier with these new materials.

County Sued for Blast Damage

SUIT FOR DAMAGES has been brought against the county-owned Green Lantern stone quarry, located southeast of Rochester, by a property owner living adjacent to the quarry in which she alleges that dynamite blasting has endangered her life and damaged her property. The county board of commissioners has refused to discontinue quarry operations, according to the report, and the complainant is seeking an injunction enjoining the county from operating the quarry.

Stone Company Develops Paving Instrument

FRANCE STONE CO., Toledo, Ohio, has developed in its laboratories an instrument, called a "profilometer," which permits one man to determine the exact degree of roughness and records changes in texture of the paving. The profilometer consists of an I-beam of aluminum with recording paper and automatic pencil on the beam, and an 8-in. measuring stick set on two glass cutters at the other end. Placed across a road the profilometer records every particle of roughness in the pavement so that engineers can study changes that have occurred and make comparisons between various types of paving.

WEST COAST ACTIVITIES

By GEO. D. ROALFE

IN COMMON WITH the rest of the country and with other industries, West Coast aggregate and cement producers have been more or less seriously affected by the "recession." The artificial stimulation of the construction industry by federally-financed operations whether handled through regular channels or by the special agencies set up for relief purposes, had created relatively large volumes of business. In California many of the major projects, such as the Metropolitan Water District, the Boulder Dam and the San Francisco bridges, in particular, are either completed or in their last stages. This section of the United States has enjoyed an abnormally large rate of increase in population and consequent new building. As a result a disproportionate share of the population has had to rely on construction for a livelihood.

Repairing Flood Damage

The entire Pacific Coast has experienced one of the hardest winters in the past two decades. Abnormal precipitation has resulted in enormous flood damage which must be repaired, and in many instances has created public demand for better facilities. It is not news to state that numerous bridges have been washed out and that many flood control works have proved inadequate under peak demands. There are few instances of well engineered reinforced concrete structures which have failed to withstand the rigors of the season.

Even now definite plans are being made to replace many timber pile or composite structures with permanent reinforced concrete bridges. It is too early to hazard a guess as to the total expenditure which will result, but the State Highway Commission of California expects to expend upwards of $8,000,000 on replacements.

As an example, the city of Long Beach (population 160,000) served with seven highway bridges, only two of which are of reinforced concrete construction, is planning to replace the other five with reinforced concrete structures. Even at this writing two are still closed to all traffic. These isolated examples are typical of conditions arising from floods over the entire Pacific slope. They vary in degree only, and each section is making definite plans to not only cure the damage but as far as possible to build in such a manner as to limit similar losses in the future.

In most sections interest is equally acute in flood control problems. That portion of the Pacific slope north of the Tehachipi mountains is characterized by large watersheds drained by long relatively flat grade rivers. Southern California alone has smaller drainage areas, accompanied by steep grades and extremely heavy run-offs in the rainy season. It is reasonable to expect that considerable quantities of rock, sand and cement will be used in this field in the next few months.

All of the above are public works, and the actual extent of work and the rapidity with which it can be pursued will depend on available public funds. The bridge and highway program will be largely cared for from the proceeds of the gasoline tax. It is being proposed to increase the state tax by one cent a gallon of gasoline for the calendar year only, to provide additional funds for replacement work. It is also expected that substantial federal assistance will be received for bridges and highways as well as flood control works. Even without desired federal assistance the sums available from local taxation will support a substantial program.

General building construction shows some signs of optimism, and there is a definite increase in interest in portland cement concrete for residence construction, both in the monolithic and precast forms.

The extent to which cement and aggregates are used in the oil industry is rarely appreciated. Common practice in the West, at present, particularly with deep drilling, is to support the rig on a massive concrete foundation, containing from 75 to 135 cu. yd. of concrete. In some areas local fire department requirements call for the enclosing of steel production and storage tanks with reinforced concrete fire walls. This is particularly true in the Los Angeles-Long Beach harbor district where a new oil field is growing very rapidly. In this section at least, the aggregate producers are enjoying a healthy volume of business which promises to continue for several months. In other oil areas, particularly the Santa Maria field on the coast, and Kern County in the San Joaquin valley, development is far more active than in recent years.

The market for rock and sand in all west coast areas is far more stable than at any time in recent years, and all signs point to a substantial increase in volume as this year progresses.

News About People

Frank A. Lee has been appointed assistant chemist at the new plant of the Gulf Portland Cement Co., Houston, Tex. Mr. Lee, who graduated from Tri-State College, Angola, Ind., in 1924 with a B.S. degree in chemical engineering, has had a wide experience in the laboratories of several cement companies.

•

W. F. McTavish, for 17 years manager, of the Orcas Lime Co., near Friday Harbor, Wash., has left for Langford, Vancouver Island, B. C., Canada, to take over the management of the lime properties in that vicinity.

•

John C. Best was elected vice president in charge of industrial sales of the National Gypsum Co., Buffalo, N. Y. Mr. Best was president of Best Bros. Keene's Cement Co., which was recently taken over by National Gypsum Co.

•

S. R. Dolasa, an engineer, connected with the Associated Cement Companies of British India, is now in this country to visit cement plants and large projects in which cement is used. During his stay in the Middle West, Mr. Dolasa attended the Concrete Industries Exposition in Chicago at the Sherman Hotel, and was a guest of the editor of Rock Products at the Chicago Engineers Club. Mr. Dolasa recently received his degree as a graduate chemical and electrical engineer in England. Before coming to the United States, he made an extended trip through Europe studying the problems of cement manufacture. The Associated Cement Companies of British India have been very successful in promoting the use of cement in their country.

S. R. Dolasa

President of the N. S. & G. A.

J. Rutledge Hill, the new president of the National Sand and Gravel Association, like his contemporary, T. I. Weston, the new president of the National Crushed Stone Association, is a Southern gentleman of distinguished South Carolina antecedents. Mr. Hill is a native of Texas, born at Wills Point, March 3, 1892, but he is a lineal descendent of John Rutledge, signer of the Constitution of the United States from South Carolina.

Browne Browne

J. Rutledge Hill

He graduated from Texas Agricultural and Mechanical College in 1913, when "Bob" Potts, past-president of the National Sand and Gravel Association, was a professor there. While a student "J. Rutledge" acquired the nickname of "Perch," by which he is still known to his intimates. He was in highway engineering and highway contracting until 1926, when he joined with P. W. Gifford to form Gifford-Hill & Co., Inc., of which Mr. Hill is vice-president. Their business includes contracting, ready-mixed concrete and concrete products as well as sand and gravel.

While now he does most of his traveling by rail, Mr. Hill was an aviator in the U. S. Army Air Service during the war, 1917-1918.

He was prominent in the public service during NRA days as a member of the Code Authority of the Crushed Stone, Sand and Gravel, and Slag Industries; chairman of its Southwest District. Also he is a past-president of the Texas Crushed Stone, Sand and Gravel Association. As a contractor he has served as a director of the Associated General Contractors of America. His home is in Dallas, Tex.

•

Melvin H. Baker, president of the National Gypsum Co., Buffalo, N. Y., and other officials of the company were recent visitors to Mobile, Ala., for an inspection of the new plant. Other officials included: Gordon Tarbell, vice-president and director; Elmer Finck, general counsel and director; Edwin F. Guth, director; F. I. Marsh, Dallas, Tex., Southwestern sales manager; W. H. Pulley, Atlanta, Ga., Southeastern sales manager, and W. H. Wilson, accountant.

•

M. A. Arnold, president of the Arnold Stone Co., Greensboro, N. C., sailed recently from New York City on the Europa for a combined business and pleasure trip to his native Germany. After landing at Bremen, he will go to Aue, his old home near Leipzig, for a visit to his people. Later, he plans to visit Leipzig for the annual building and engineering fair, which has been held there for some 700 years, to witness demonstrations of new types of concrete machinery. He will return by way of London, England, and expects to return about the latter part of April.

•

Russell M. L. Carson was recently elected president of the Jointa Lime Co., Glens Falls, N. Y., succeeding the late J. Irving Fowler. Mr. Carson was formerly vice-president of the company, and is succeeded in that capacity by Frank J. Crowe, a director of the company. Other officers are Herbert J. Russell, treasurer and general manager, and Miss Dorothy V. Day, secretary and assistant treasurer.

•

Walter Lewis, office manager of the Three Forks Portland Cement Co., at Butte, Mont., for the past nine years, has been transferred to Spokane, Wash., where he will represent the company in the sale of plaster, covering the eastern Washington and eastern Oregon territories.

•

G. C. Brunnhoeffer succeeded Frank Lanham as superintendent of the Louisville Crushed Stone Co., Louisville, Ky., last fall. Previous to his new connection, Mr. Brunnhoeffer had had considerable highway and general construction experience in the states of Indiana and Pennsylvania.

(*See page 79 for Obituaries*)

Chemists' Corner

English Cement Company Uses Concrete For All Fixtures

LABORATORY Built For PERMANENCE

By ALLEN P. CHILD

TO provide facilities which may be readily maintained in a clean condition for the chemical and physical tests, the Tunnel Portland Cement Co., Ltd., of West Thurrock, Essex, England, has made novel use of concrete in their laboratories.

Concrete shelves in the various laboratory rooms of the new building were designed to be built in so that they are permanent fixtures. It is possible to wash the shelves off with running water, from time to time, to eliminate effectively any dust accumulation. The tops of the shelving units are covered with rubber for the safe handling of chemicals in bottles, which might be broken by frequent handling on bare concrete shelves.

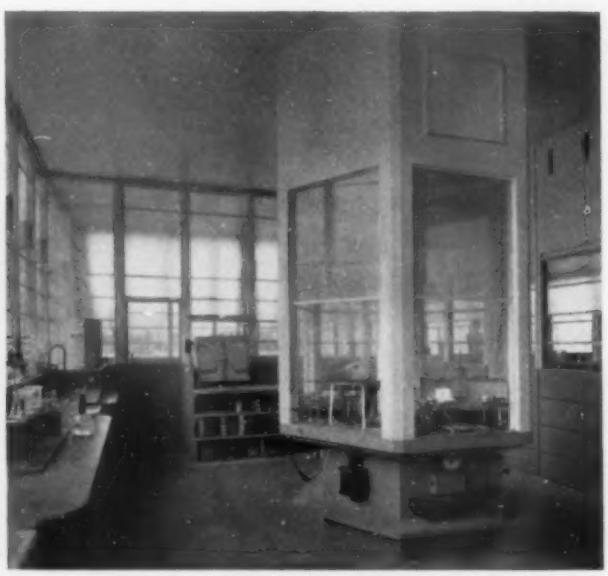
Air in the laboratories is kept circulating so that tests being made on cement products will not be affected by outside conditions. The stale air passes into ducts beneath the floor through openings above the floor level.

Working benches of concrete in laboratory. Note unusual lighting fixtures on window frame posts

Work benches for experimental tests are provided by building concrete shelves along the continuous wall of windows of the structure in order to provide the maximum of daylight for the research workers. Where artificial light is needed, a clever use is made of slotted openings in the uprights between the windows for the electric lamp fixtures so that an abundance of light is thrown directly on the work benches.

Where the workers require desks, concrete desk structures are cast directly into place in the floor. The concrete desks are provided with steel drawers supported on cantilever concrete shelves cast into the desk during its construction.

Cases that house delicate testing instruments are of reinforced concrete so that no injury will be done to them through the vibration prevalent in many types of laboratory structures.



Left: Concrete desk cast into the concrete floor. The tops of all concrete desks, tables and shelving are covered with rubber. Right—Laboratory cases of concrete are cast into the floor, largely eliminating any vibration which may affect delicate instruments

Recent European Research In Cements

By Dr. GABRIEL ASHKENAZI

Consulting Chemist, Brooklyn, N. Y.

FOR THE LAST THREE YEARS a renewed interest in Ferrari cement can be noticed among the cement experts abroad. This type of cement was introduced in the portland cement industry by F. Ferrari in the early twenties, and its production was patented in several countries. The main characteristic of this cement is a content of alumina and iron oxide in equamolecular proportions. In many countries the manufacturers started to produce this cement, but for different reasons its production was suspended.

According to the French "Revue des Mater. de Constr. et de Trav. Publ." (Nov., 1937), Prof. F. Ferrari published several months ago in the "Il Cemento Armato" (May, 1937) an assay about his cement. He emphasizes its excellent properties, its moderate shrinkage and heat of hydration, as well as its superiority regarding its elasticity during hardening. In comparison with other cement-clinkers, the burning is more facile and requires less fuel, and, due to its augmented hydraulic properties, an excessively fine grinding can be omitted, thus reducing the costs of production. According to F. Ferrari the best results are obtained by using a raw mix of a Al_2O_3—Fe_2O_3 ratio equal to 0.65 and of a low silica modulus.

Upon the suggestion of Prof. H. Kuehl, Dr. H. Albert undertook an exhaustive investigation about the Ferrari cements. ("Tonindustrie Zeitung" No. 91, Nov, 1937.) The results of his work, representing a Doctor Dissertation at The College of Technology in Berlin, are published now in a book edited by "Chem. Labor. fuer Tonind." Berlin.*

Dr. Albert's "Dissertation" is very interesting and in some respects unique, regarding the methods of investigations. A part of his work was carried out in the laboratory, applying the usual cement laboratory equipment; the other part was executed in a modern cement plant, which was entirely at his disposal. The fact that the preparation of various types of cement was made in a commercial way, gives this work greater importance. Interesting suggestions regarding the burning of Ferrari cement with a low silica modulus are outlined. The difficulty in burning such mixtures was one of the principal reasons which hindered the utilization of Ferrari's patents by the cement manufacturers. Although the space assigned for this review does not permit giving all the details, the raw mix was clinkered in a Lepol kiln, using oil as a fuel. Five kinds of Ferrari cement were produced. For comparison purposes, a standard portland cement, a Kuehl cement, and a high early strength cement were made in the same plant using the same raw ingredients.

The best results were shown by a Ferrari cement composed of 75 percent C_3S and 25 percent C_4AF, with a silica modulus equal to 1.47. The comparison of this cement with other cements showed its superiority in all properties, such as strengths, shrinkage, elasticity and resistance to aggressive solutions.

The remarkable results of this investigation apparently proved once more the exceptional qualities of Ferrari cement. Hence, it is not surprising that some of the cement experts are ready to see in it a universal cement for "all purposes." In a recently published article ("Zement" No. 1, January, 1938) Prof. F. Ferrari relating the story of his cement and considering the newest investigations, expresses the opinion that this "type of cement may soon become generally accepted in place of portland cement."

The reviewer is not yet inclined to generalize the results of these investigations. He is cognizant of plant experiments in the same direction with less favorable results. Nevertheless, Dr. Albert's work deserves the closest attention of the cement manufacturers and research chemists. Apart from the practical interest, it is of great theoretical value to establish whether the properties of Ferrari cement are caused by the absence of binare compounds of sesqui-oxides, or the augmented proportion of iron oxide, acting as a flux, favors the sintering process, thus producing a superior clinker. Consequently this brings to the foreground the problem about the role of calcium ferrite compounds and that of "Brownmillerite", in the hydraulic properties of cement.

It is generally admitted that the "celit" part of portland cement is identical with tetracalcium-alumina-ferrite (Brownmillerite). In the opinion of Toshiyoshi Yamaushi of the Ceramic Department University of Engineering at Tokyo, this admission is still not sufficiently proved and needs more study. For this purpose he investigated a series of products obtained by burning various mixtures of lime, alumina and iron oxide. The oxides had been mixed in the following molar proportions: 3C:A:F, 4C:A:F, 5C:A:F, 6C:A:2F, and 6C:2A:F.

The results of this investigation are published in the "Journ. Ceramic Associat." V. 45, No. 534, 1937, p. 361 and ff. It has been established that each of the samples, produced by burning of the above mentioned mixtures, consists chiefly of a crystalline mineral, a compound of a ferric oxide series. This mineral, of deep red and brown color and fibrous structure, shows a strong double refraction and high refractive index. The microscopic examination showed a zonal structure, indicating a solid solution.

The x-ray analysis gave diffraction patterns of the bicalcium-ferrite type. The principal mineral referred to, which fills out the whole or the most part, of each sample, seems to have the internal structure of the same type, but each sample differs regarding the interplanar spacing of latice. The latice spacing is reduced in the following succession: samples obtained by burning of 6C:A:2F, → 3C:A:F, → 5C:A:F, → 4C:A:F, → 6C:2A:F. Thus, the state of a solid solution is indicated by the principal mineral in all the samples.

The principal mineral in the sample obtained by burning of the mix 6C:2A:F is a solid solution of greatest miscibility.

Results of x-ray analysis induce the Japanese scientist to question the existence of Brownmillerite. He states: "it is right and proper rather to think of the existence of such a ferric oxide compound of high lime alumina content, as existing in the sample of burned 6C:2A:F mix, than of the Brownmillerite."

The examination of the principal mineral in the burned mixtures with the lime content higher than in 4C:A:F mix, namely in those of 5C:A:F, 6C:2A:F, etc., showed that with the increase of the amount of lime in the mixture, the content of lime-alumina in the principal mineral decreases.

Microscopic examination of the sample produced with the mix 5:C:A:F showed the co-existence of free lime in grani-form, of C_2AF and of a ferric oxide series compound. This compound (probably a solid solution) contains less lime alumina than Brownmillerite. In accordance with the above T. Yamaushi assumes that the high lime special cements, of alumina-iron oxide molar ratio equal to 1, contain a ferric oxide series compound (as a solid solution), the lime alumina proportions of which are lower than those of Brownmillerite.

* Dr. Ing. H. Albert. Die Herstellung und die technishe Eigenschaften von Ferrari Zementen. Berlin. 1937.

LIME PRODUCERS' FORUM

Conducted by Victor J. Azbe, Contributing Editor, St. Louis, Mo.

A Trinidad Lime Plant

AN INTERESTING LETTER has been received by the FORUM EDITOR from Philip L. Corson, president and purchasing agent of G. & W. H. Corson, Inc., Plymouth Meeting, Penn., describing a recent trip to Port of Spain, Trinidad, West Indies, where he visited a new lime plant. Several features of this operation are of general interest, and the information in the letter is therefore being passed on to the industry. The letter follows:

"While on a short trip this past winter I was interested in visiting a lime plant of the Trinidad Trading Co., Ltd., Port of Spain, Trinidad.

"I was very cordially received by Capt. R. D. Cansdell, general manager of this company's lime department. I spent a most pleasant morning with Capt. Cansdell, and he showed me around their lime plant, which was indeed, most interesting. I took a few pictures of the plant. Fig. 1 shows Capt. Cansdell and his assistant standing in front of the office.

Fig. 1. To the left, Capt. R. D. Cansdell, general manager, lime department, Trinidad Trading Co., Ltd., and his assistant

"The deposit of limestone which is of a high calcium variety, analyzes approximately 97 percent calcium carbonate and occurs in a very unusual manner. It is located in fairly small pockets very near the top of a very steep hill. Most of the stone is 150- to 200-ft. above the ground level of the lime plant, and there are a great many difficulties encountered in quarrying this stone due to the fact that it occurs in small pockets.

"Fig. 2 shows one corner of one of the quarry openings with native workmen loading cars. These natives work on piece work and do quite well, making from $12 to $15 per week as compared to the day laborer, who is paid approximately 10c per hour.

"The stone, after it has been loaded in cars, is pushed down a slight grade to a ramp, where it is dumped into a large pile. From this point it is re-sorted and the inferior stone thrown into a crusher from which it is conveyed by long belt conveyor to a roller type pulverizer. This pulverizer produces about 60 tons per day of pulverized limestone, 85 percent through 100 mesh. There is a large elevator which takes the material from this pulverizer to a 300-ton storage tank from which the material is bagged either into open mouth paper or cloth sacks. The purer stone is again loaded in cars and pushed out on a

From left to right: Fig. 2. Corner of one of the quarry openings with native workmen loading cars. Fig. 3. Looking from the top of the kiln tramway toward the stone sorting pile. Fig. 4. View of the kiln with a small portion of the lime and limestone pulverizing plant on the right.

tramway from which it is dumped into the kilns.

"Fig. 3 is a picture taken from the top of the kiln tramway looking toward the stone sorting pile. Fig. 4 shows a view of the kiln with a small portion of the lime and limestone pulverizing plant on the right. The kiln is fired with a very cheap grade of oil which costs only a little over 2c per gallon in Trinidad. The kiln has only recently been erected and is very well constructed. There are four oil burners, two into each furnace of the kiln. The general type of construction is similar to a standard Arnold & Weigel kiln.

"Steam atomization is used for burning the oil and an unusually good mellow heat is produced. Some difficulty is being encountered due to draft being choked by the stone disintegrating in the kiln, and Capt. Cansdell is considering induced draft. The lime is drawn from the kilns over a screen and the lumps are barreled generally in 500-lb. returnable drums. The fines are taken and hydrated to be used for building and agricultural purposes. Only a small proportion of the lime is used for this purpose and the whole operation is done by hand."

No Silicosis from Limestone Quarrying

NEW YORK STATE INDUSTRIAL DEPARTMENT is attempting to compel all quarry operators to install dust-collecting or prevention equipment under the new state code designed to reduce silicosis hazards. Nearly all authorities agree that breathing limestone dust is a preventive rather than a cause of silicosis. Six New York State quarry operators are appealing the department's order to install "approved equipment" for reducing dust in quarry drilling. Dr. Leroy U. Gardner, director of the Saranac Laboratory at Saranac Lake, an outstanding authority on tuberculosis and silicosis, recently told the State Board of Standards and Appeals he had made x-ray tests of 21 workers at the Glens Falls Portland Cement Co. He said 14 men showed negative silicosis tests and seven showed non-significant "lung shadows."

"I feel very strongly that there is no hazardous occupation in this quarry," Dr. Gardner said. "The seven non-negative tests are of no clinical significance. The tests are no justification for silicosis diagnosis."

Asked if in a normal occupational life of 30 to 40 years, these workers would develop silicosis, he replied:

"They would not."

Other operators of limestone quarries who are protesting the state orders are the New York Trap Rock Corp., the General Crushed Stone Co., the Federal Crushed Stone Co., the LeRoy Lime and Stone Co., and the Cushing Stone Co.

National Lime Convention

ANOTHER year has passed and the time is drawing close for the 1938 annual gathering of lime men. This year the Netherland-Plaza Hotel, Cincinnati, Ohio, will be our host on May 9, 10, and 11. President Walter Stauffer of the National Lime Association has worked hard to prepare an interesting meeting for all.

Following the plan of last year's successful operating session, the 1938 sessions will be made bigger and better with features on the program of interest to the superintendent as well as the president and sales manager.

Among the many topics to be discussed will be the following subjects: Diesel Engines, Explosives, Safety, Cost Accounting, and Labor Relations. Kilns and gas producer installations also will be well covered in the discussions of methods of obtaining higher capacity, construction of efficient kilns at an economical cost, and the burning of spalls in vertical kilns which is now being done successfully in one plant. Other tentative plans for the program are not yet ready for announcement.

Everyone attending the convention will be more than fully repaid for his time and expenses. It is more important than ever before to be informed about the latest developments in the industry, and this meeting is the only one which a lime man may attend with profit to his individual business, where he can secure a picture of the future trends, and obtain both information and inspiration for the development of his own plant.

We want to make a special appeal to lime plant executives to BRING YOUR SUPERINTENDENT. If you do not give him an opportunity to develop, the plant will not develop. Bring him along, and you will find that you will have a more loyal, more progressive and aggressive helpmate.

New Lime Operation

OKOLONA LIME PLANT CO., Okalona, Miss., started operations on the F. T. Harris farm 1½ miles from Okolona early in March. The plant is being operated by F. T. Harris and Joe Jolly of Okolona. A survey by Dr. W. C. Morse of the University of Mississippi classified the deposit as Selma chalk, which is said to make a superior grade of lime. The strata is the same as that crushed for several years near Okolona by a state-owned plant, which was destroyed by fire two years ago.

Enlarge Lime Plant

OREGON LIME PRODUCTS CO., Williams Creek, Ore., is installing a $20,000 hydrating plant. The new, electrically driven installation will give the lime company a complete and modernly equipped plant. The plant recently resumed operation following a shutdown caused by a slide of 2000 tons of earth into the quarry during a period of continued rain and snow.

Lime Statistics

SHIPMENTS (sales) of lime in 1937 in the United States, according to preliminary figures furnished the Bureau of Mines by producers, comprising about 80 percent of the industry, increased approximately 4 percent, compared with 1936, when an increase of 26 percent over the previous year was recorded. The total sales indicated amounted to 3,882,000 short tons valued at $28,375,000.

Following the general trend of most manufacturing industries in 1937, demand for lime ran well ahead of the previous year during the first several months, slowed down after midyear, and was very poor indeed during the last quarter. The decline in the latter half year virtually cancelled the gains during the first half. Business was spotty, some companies reporting much better sales while others selling to the same industry and even in the same territory were unable to ship as much as they did in 1936.

Lime for agricultural use (392,000 tons valued at $2,586,000) was the only class that showed a substantial increase (16 percent) in total sales, although even in this field, many companies reported decreases in output. Notwithstanding an increase of about 10 percent in building construction, the quantity of lime reported sold for construction (898,000 tons valued at $7,837,000) increased only one percent. So-called "chemical" lime (exclusive of dead-burned dolomite)—used in chemical, metallurgical, and other process industries—amounted to 1,984,000 tons valued at $12,762,000, the increase of only 3 percent in tonnage being somewhat disappointing in view of the high rate of activity in iron and steel, paper, and a few other lines during a large part of the year. Dead-burned dolomite shipments (608,000 tons valued at $5,190,000) increased only 2 percent.

Prices throughout the country were slightly higher than in 1936. The average value reported for 1937 was $7.31 compared with $7.18 in 1936.

Hydrated lime, included in the total output, amounted to 1,237,000 tons valued at $10,205,000, an increase of about one percent in quantity and 7 percent in value. About one-half of the hydrated lime is used by the building trades, one-third for chemicals, and the remainder for agriculture.

HINTS AND HELPS FOR SUPERINTENDENTS

Build Up Dipper Bail Lug by Welding

By CLARK H. WRIGHT
Snyder, N. Y.

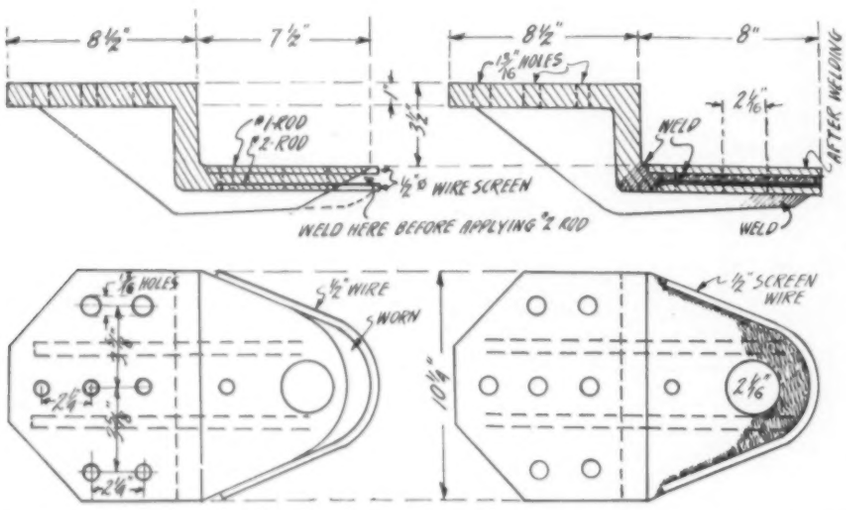
IN ROCK EXCAVATION a complete, built up dipper, consisting of manganese steel, is under a most severe test, due to abrasion, especially the dipper teeth points, both sides of the dipper lip, the heel of the dipper, the latch plate, and the dipper bail lugs. The dipper bail lugs, however, are usually made of cast steel.

The top edge of the dipper bail lugs will wear out almost to the pin hole. (The pin holds the dipper bail to the side of the dipper and acts as a hinge point.) Very often these lugs, when worn very badly will break at the hole and bend the bail, because one side, which is not worn quite as much as the other, will hold.

When these lugs are built up with an electric welder, a much better wearing job is obtained than when the casting was new, because new castings are not heat treated to make them stand the wear to which they are subjected in handling broken rock. When an electric weld is applied to cast steel with the proper welding wire, the surface of the metal becomes very hard and tough.

To build up these dipper bail lugs, two pieces of ½-in. rough screen wire were bent to the shape of the lugs before they were worn out. One of the screen wire sections is welded on first, the casting is filled up where worn, and the second screen wire is then welded in place. If the first section of screen wire is not built up before the second piece is set in place, it will be difficult to weld behind the second piece and a solid job of welding cannot be done. To make an approximately perfect job of electric welding, it is necessary to keep the piece to be welded open to good welding action and not try to weld where it is difficult to apply the welding wire. Where this is attempted, it will be noticed, if the weld is sawed in two, that the weld is porous like a sponge. Welding in a pocket is very detrimental to good welding, because when it is done with a coated wire, more or less foreign matter or slag lays in this pocket and will not make a solid, homogeneous weld.

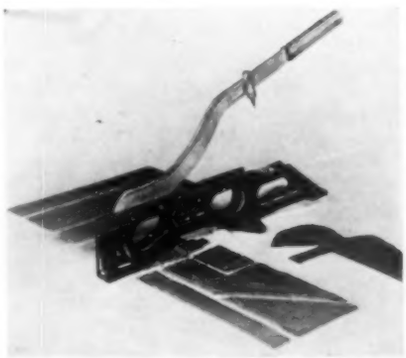
After completing the welding and shaping of the casting, take some coated cast iron welding wire and, using between 250 and 300 amps, weld a coating over all parts welded. This coating gives the casting a very hard wearing surface.



Showing proper method of welding dipper bail lug which has been worn almost to the pin hole

Cutter and Punch for Slate Shingles

NO SATISFACTORY portable tool had been available to cut and punch slate until the development of the device shown in the illustration. This new 5½-lb. portable combination roofing slate and asbestos shingle cutter and punch is being introduced by Parsons Bros. Slate Co., Pen Argyle, Penn., miners and manufacturers of slate. With the new tool, any person engaged in the building trades or even inexperienced labor can cut and fit slate to a roof. It cuts roofing slate and asbestos



Combination cutter and punch for cutting slate

any length or width up to and including ¼-in. thickness; and it cuts round corners and right angles.

The frame of the tool is of malleable iron, and the knife and punch-point of selected heat-treated steel. The knife is drop forged and electro-cadmium plated to prevent rusting. One side of the frame is threaded for tightening the axle bolt and knife for side play, the nut acting only as a lock nut. The hub of the knife blade is designed to be packed with a light grease. It is believed by the slate industry that the introduction of this slate cutting tool will promote the wider use of slate shingles.

Mean Temperatures in Lime Kilns

By N. W. TAYLOR,
Morgantown, W. Va.

THE USUAL LIME KILN in use today is the shaft type kiln. These kilns were in use when the advantages of the rotary type kiln, such as used in cement manufacture, became generally recognized. A lime kiln with replaceable lining remains serviceable over a long period of years and the added efficiency of rotary kilns has not been generally considered of sufficient worth to reimburse the added capital investment of installing rotary equipment at once.

The efficiency of a shaft type kiln can be greatly increased by proper investigation and control of the mean or average temperature maintained in the kiln. On firing a shaft kiln, a few plants use

gas or oil burners controlled by a draught from a fan that develops a pressure up to 15 lb. per sq. in. above atmospheric pressure. A few lime manufacturers have experimented with pulverized coal and coal fed by an automatic stoker. A great many of the smaller plants continue to use wood or coal or a mixed fuel of both wood and coal. These smaller plants as a rule have made no improvements directed toward controlling the internal temperature of the kiln.

Limestone begins to calcine or lose its carbon dioxide at a temperature of approximately 1200 deg. F. After continual exposure to this temperature over a period of four to five hours and in most cases by gradually incrasing the temperature to 1600 deg. the reaction is completed.

The fireman usually examines the stone in the eye of the kiln during burning. Burned quicklime glows in the flame with a pure white light. Uncalcined spots or "cores" effuse a violet to red glow. When unburned "cores" or "bone" shows up in the eye of the kiln or an excessive amount of "core" is drawn with the lime, the draft is sealed off at the drawing door by use of lime putty and the fuel ratio is increased to produce a greater heat. Drawing is sometimes slowed down.

If the heat is too great, overburned lime may result. The lime will burn into hard lumps that require, even when pulverized, an excess of water for hydration. Hydrate produced from overburned quicklime usually shows a poor plasticity test. It is possible to attain high temperatures in a large kiln, especially if gas or oil is used for fuel. Fire-brick linings that have been laboratory tested to show they can withstand 3,000 deg. F. have been known to melt and run in kiln heat.

Beyond a question of a doubt, the quality of product can be improved and a worthwhile saving in fuel effected by exercising proper temperature control.

In a mixed-feed kiln it is even more difficult to control the temperature. The proper ratio of fuel to stone is too often applied by rule of thumb.

How to Estimate Kiln Temperature

A simple device can be installed at small cost to give an accurate temperature record. At a considerable height in the side of the kiln, drill a hole through the outer shell. Work an opening alongside of one of the fire bricks of the lining and introduce a length of ½-inch pipe into the opening so the end of the pipe sets flush with the inside wall of the kiln lining. Weld straps of iron to the outside of the kiln shell to support a small platform. Mount a small motor such as used to operate a sewing machine, and a small inclosed induction fan on the platform. Connect the pipe leading from the interior of the kiln to the fan. Provide another opening in the kiln wall and connect another pipe to lead the hot gases from the fan back into the kiln. Connect the fan inlet and outlet with leaded connections, making them absolutely air-tight. Weld the space between the hole in the shell and the pipe, making it air-tight, by use of an acetylene weld.

Tap the inlet end of the pipe as near the kiln shell as possible, to leave room for a thermometer and attach a recording thermometer. Now cover pipe and fan shell with a coating of asbestos and fire clay and further coat the pipe with an "air cell" asbestos paper jacket. By operating the fan at a uniform speed over a 24-hour period, the recording chart will give a definite check on the variations of temperature.

The fireman usually covers the grates with a uniform coating of fuel and adds fuel at regular intervals. This practice can be regulated in accordance with the thermometer's showing of the temperature.

In a mixed-feed operation the thermometer reading will allow proper adjustments in the ratio of fuel to stone. A pipe connection without induction fan will not give a true reading of the kiln temperature as the gasses passing through the vent may not be a true sample of the gases circulating through the kiln, unless such gases are induced by constant circulating draft.

Loading Concrete Products Economically

LAKE VIEW CONCRETE TILE CO., Lake View, Iowa, is utilizing an ancient truck for loading concrete tile and other products for rail shipment. Small flat cars loaded with products are pushed up an incline over standard gauge track to the door of the railroad freight car. The truck has been converted to a four-wheel drive and is weighed down with stone to give traction in traveling up an incline. A freight car can be loaded in less than an hour with this equipment, and plant transportation costs have been substantially reduced.

Safety Covering for Gyratory Crusher

AT THE GRAVEL PLANT of the Consumers Co., Beloit, Wis., a gyratory crusher is used to break the larger stones brought from the pit. These small boulders are very tough, which results in some of the

Portion of discarded screen used as a safety cover over gyratory crusher

stones bouncing back as they are delivered to the crusher. This might cause painful injuries to anyone working near, if a simple guard had not been erected around and over the crusher. This guard consists of old sheet metal set vertically around the crusher to a height of about 18 in., and then covered with two strips of old screen surface from a revolving screen. The screens have been cut to shape, so they just fit over the crusher with no opening except at the chute.

This safety device not only prevents stone from being thrown out into the crusher room, but at the same time allows for efficient operation of the crusher, since a bar can easily be put down through the screen should there be any clogging of the crusher.

Safety measures of this kind cost practically nothing as the materials involved can usually be found in the scrap pile.

Truck, converted to four-wheel drive and mounted on flanged wheels, is used to push small flat cars loaded with concrete products to railroad freight cars

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends	
Aetna P. C., cap.[51]	2-23-38	20	26		No dividend
Allentown P. C. (Penn.), com.[51]	2-23-38	6¼	..		
Allentown P. C. (Penn.), 6% cum. pfd.[51]	3-23-38	7¼	..		
Alpha P. C., com.	3-22-38	12	13	.25	Mar. 25
American Aggregates, 1st mtg., 5/6's 1943, new bonds[42]	3-19-38	80	85		
American Aggregates, com.[42]	3-19-38	2½	3½		
American Aggregates, pfd.[42]	3-19-38	20	30		
Arundel Corp., com.	3-25-38	14½	..	.25	Apr. 1
Ash Grove L. & P. C., com.[51]	2-23-38	11	..		
Ash Grove L. & P. C., pfd.[51]	2-23-38	90	..		
Basic Dolomite Inc., com.				.15	Mar. 1
Bessemer L. & C., com.[42]	3-19-38	2¾	3¾		
Bessemer L. & C., pfd.[42]	3-19-38	18	22		
Bessemer L. & C., 1st 6½'s, 1947[42]	3-19-38	91	95		
Bessemer L. & C. 6's, 1955[51]	3-23-38	91½	93½		
Boston S. & G., com.[37]	3-19-38	1	2		
Boston S. & G., 7% pfd.[37]	3-19-38	5	9		
Boston S. & G., 7's 1939[37]	3-19-38	81	..		
Calaveras Cement, com.[49]	3-23-18	3½	4		
Calaveras Cement, 7% pfd.[49]	3-23-38	48	55		
California Art Tile., A[9]	3-21-38	8½	9¼		
California Art Tile, B[9]	3-21-38	.90	1.50		
Canada Cement, com.[42]	3-19-38	10¼	..		
Canada Cement, pfd.[42]	3-19-38	103	..	1.25	Mar. 21
Canada Cement, 4¼'s, 1951[42]	2-21-38	103¼	104	2.00	Mar. 21
Carolina P. C., 8% cum. pfd.[51]					
Cleveland Graphite Bronze				.25	Mar. 24
Consol. Cement A[52]	3-23-38	..	3¼		
Consol. Cement, 1st 6's 1950[52]	3-26-38	56	60		
Consol. Okla. S. & G. 6½'s, 1948[42]	2-23-38	..	25		
Consol. S. & G. pfd.[50]	3-19-38	73	..		
Consol. Rock Products, units[50]					
Consumers R. & G. 1st Mtg. 6's 1943[51]	3-26-38	22	24½		
Consumer Co., 5's					
Coosa P. C., 1st 6's[51]	3-26-38	59½	..		
Coplay Cement Mfg., units[50]	2-28-38	7	..		
Coplay Cement Mfg., 6's 1941[50]	2-28-38	90	..		
Cumberland P. C., units[50]	2-23-38	..	53		
Dewey P. C., com.[51]	3-26-38	21½	23½		
Diamond P. C.[36]	3-19-38	8½	9½		
Dolese & Shepard	3-23-38	22	..		
Federal P. C., 5's 1947[33]	3-23-38	6¾	..		
Federal P. C., 5's, 1947[5]	3-19-38	60	65		
Fla. P. C., units[50]	3-26-38	17	19		
Fla. P. C., 6½'s 1937[46]	3-21-38	100	..		
Giant P. C., com.[50]	3-26-38	1½	2½		
Giant P. C., pfd.[50]	3-26-38	8½	10½		
Glens Falls P. C., com.[51]					
Glens Falls P. C., pfd.[51]					
Great Lakes P. C., B[51]					
Gyp., Lime & Alabastine	3-19-38	6¾	..		
Gyp., Lime & Alabastine, 5½'s, 1943[43]	3-22-38	4½	8		
Hercules Cement, com.[51]	2-28-38	50	60		
Ideal Cement, com.[50]	3-26-38	20	22	.35	Mar. 31
Kelley Island L. & T.	3-22-38	15	18½	.25	Mar. 24
Ky. Rock Asphalt, 6½'s, 1936[48]	3-21-38	35	..		
Ky. Stone Co., v.t.c.[46]	3-21-38	6	7		
Ky. Stone Co., 5%, 1956[46]	3-21-38	40	45		
Keystone P. C., pfd.[51]	3-23-38	29½	..		
Lawrence P. C., com.	3-21-38	12½	14		
Lawrence P. C., 5½'s, 1942[50]	3-26-38	97	100	called	April 1
Lehigh P. C., com.	2-26-38	18¼	18¾	.25	May 2
Lehigh P. C., 4% pfd.	3-23-38	101	101½	1.00	April 1
Lone Star Cement, com.	3-21-38	33⅜	..	.75	Mar. 30
Longhorn P. C. Co.[51]	3-23-38	6¼	..		
Louisville Cement	2-27-38	35	40		
Lyman-Richey, 1st 5's, 1945					
Marbelite Corp., com.[40]	3-23-38	.40	.60		
Marbelite Corp., pfd.[40]	3-23-38	4	5		
Marblehead Lime, 7's, 1944					
Marquette Cement, com.[36]	3-26-38	30	31½		
Marquette Cement, pfd.[36]	3-26-38	100	..		
Material Service Corp.[39]	3-26-38	12	..		
McCrady-Rodgers, Class "A"	3-26-38	4	..		
McCrady-Rodgers, 7% pfd.[36]	3-26-38	24	..		
Medusa P. C., com.	3-23-38	94	..		
Medusa P. C., 6% cum. pfd.[39]	3-23-38	15	16½	1.50	April 1
Minnesota Mining & Mfg. Co.	3-24-38	27	29	.40	Mar. 30
Missouri P. C.	3-23-38	11	..		
Monarch Cement, cap.[51]	2-23-38	90	100		
Monolith P. C., com.[9]	3-21-38	3¼	4		
Monolith P. C., 8% pfd.[9]	3-21-38	6	7		
Monolith P. C., 1st mtg.[9]	3-21-38	102	104		
Monolith Portland Midwest, pfd.[9]	3-21-38	2½	3½		

Stock	Date	Bid	Asked	Dividends	
National Gypsum, A., com.	3-21-38	6¾	..		
National Gypsum, 1st pfd.	3-23-38	12	13	1.75	April 1
National Gypsum, 2nd pfd.				.25	April 1
National L. & S., 6½'s, 1941[42]	3-21-38	98	..		
Nazareth Cement, com.[50]	3-26-38	4	6		
Nazareth Cement, 7%, pfd.[50]	3-26-38	24	..		
Newaygo P. C., pfd.[51]	2-23-38	91	..		
New England Lime, units					
N. Y. Trap Rock, 7% pfd.[42]	3-21-38	60	..		
North Amer. Cement, 6½'s, 1940[50]	3-26-38	60	..		
North Amer. Cement, 6½'s, 1943[50]	3-26-38	72	..		
North Amer. Cement, 1st 6½'s 1953[50]	3-26-38	20	..		
North Amer. Cement "A" pfd.[50]	3-26-38	2	4		
North Amer. Cement, com. A[50]	3-26-38	1	..		
North Amer. Cement "B" pfd.[50]	3-26-38	4	5½		
Northwestern P. C., units					
Northwestern States P. C.[53]	3-26-38	19	21		
Ohio River S. & G., com.	2-27-38	..	1		
Ohio River S. & G., 1st pfd.	2-27-38	..	7		
Ohio River S. & G., 2nd pfd.	2-27-38	..	71		
Ohio River S. & G., 6's[46]	3-21-38	15	..		
Oregon P. C., com.[40]	3-23-38	1¾	2½		
Oregon P. C., 1st pfd.[40]	3-23-38	87	92		
Pacific Coast Aggr., new com.[40]	3-23-38	1.70	2		
Pacific Coast Cement, com.					
Pacific P. C., com.[40]	3-23-38	1½	2¼		
Pacific P. C., pfd.[40]	3-23-38	43	50		
Peerless Cement, com.[50]	3-26-38	2⅝	3⅛		
Penn.-Dixie Cement., com.	2-26-38	4¼	4½		
Penn.-Dixie Cement, pfd., A	2-24-38	22	..		
Penn.-Dixie Cement, 6's A, 1941					
Penn. Glass Sand Corp., v.t.c.	2-26-38	14¼	15		
Penn. Glass Sand and Corp., pfd.				1.75	April 1
Penn Glass Sand Corp., 1st mtg. 4½'s, 1960					
Petosky P. C., com.[51]	3-26-38	5	5¾		
Riverside Cement, A[9]	3-21-38	7	9		
Riverside Cement, B[9]	3-21-38	1	1½		
Riverside Cement, pfd.[9]	3-23-38	58	90		
Santa Cruz P. C., pfd.[9]	3-21-38	25	28		
Schumacher Wallboard, com.[9]	3-21-38	2	2¼		
Schumacher Wallboard, pfd.[9]	3-21-38	5½	11		
Signal Mt. P. C., com.[53]	3-26-38	1¼	2¼		
Signal Mt. P. C., pfd.[39]	3-26-38	61	..		
Signal Mt. P. C., units[53]	3-23-38	61½	..		
Southern States P. C., cap.[51]	2-23-38	42	..		
Spokane P. C., units					
Standard Pav. & Mat., com.[42]	2-21-38	2¾	3½		
Standard Pav. & Mat., pfd.[42]	2-21-38	..	25½		
Standard Silica, com.					
Superior P. C., pfd.					
Superior P. C., A[40]	3-23-38	30	45	.82½	April 1
Superior P. C., B[40]	3-23-38	6¼	7¼		
Southwestern P. C., units[40]	3-23-38	190	..		
Trinity P. C., units[50]	3-26-38	87	..		
U. S. Gypsum, com.	3-22-38	64	..	.50	April 1
U. S. Gypsum, pfd.	3-22-38	165	..	1.75	April 1
Volunteer P. C., 1st 7's, 1942[46]	3-21-38	100	..		
Volunteer P. C., units[46]	3-21-38	70	..		
Vulcanite P. C., com.[42]	3-19-38	¾	4		
Vulcanite P. C., 7½'s, 1943[46]	3-21-38	100	..		
Wabash P. C.[50]	3-26-38	8	..		
Warner Co., ww. 1st 6's, 1944[46]	3-21-38	60	62		
Warner Co., com.[50]	3-26-38	3½	4½		
Warner Co., pfd.[50]	3-26-38	8	10		
Whitehall Cement Mfg., com.[51]	2-23-38	50	..		
Whitehall Cement Mfg., pfd.[51]	2-23-38	55	..		
Wisconsin L. & C., 1st 7's, 1940					
Wolverine P. C., com.					
Yosemite P. C., 4% pfd.[40]	3-23-38	2½	3	.10	April 1

Quotations by [9]A. E. White Co., San Francisco, Calif. [34]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [36]Merrill, Turber & Co., Cleveland, Ohio. [37]Wise, Hobbs & Seaver, Inc., Boston, Mass. [40]Martin Judge Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Ltd., Toronto, Ont. [46]First National Bank of Chicago, Chicago, Ill. [49]E. S. Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill. [51]Paul D. Sheeline & Co., Boston Mass.

RECENT DIVIDENDS ANNOUNCED

Ideal Cement, com.	$. 35	Mar. 31
Medusa P. C., 6% cum. pfd.	1.50	Apr. 1
Minnesota Mining & Manufacturing Co.	.40	Mar. 30
Penn. Glass Sand Corp., pfd.	1.75	Apr. 1
Superior P. C., "A"	.82½	Apr. 1
U. S. Gypsum, com.	.50	Apr. 1
U. S. Gypsum, pfd.	1.75	Apr. 1
Yosemite, P. C., 4% pfd.	.10	Apr. 1

PENNSYLVANIA-DIXIE CEMENT CORP., New York City, and wholly-owned subsidiaries reports for year ended December 31, 1937, a net profit from operations of $28,382 after interest, federal, normal taxes $16,750 surtax on undistributed profits, and depreciation and depletion charges on the basis established by vote of stockholders at last annual meeting which is the basis used for federal income tax purposes, but exclusive of $24,445 profit on purchase of company's bonds. Including profit on purchase of company's bonds, total net profit for 1937 was $52,827, equal to 43 cents a share on 121,200 no-par shares of Series A convertible $7 cumulative preferred stock on which dividend accumulations on December 15, 1937, amounted to $57.75 a share.

	1937	1936
Net sales	$5,977,368	$6,392,004
†Cost of sales, etc.	2,935,752	2,821,050
Selling and administration expense	1,222,455	1,134,297
Maintenance and repairs	486,360	407,891
Taxes	224,051	181,601
Provision for uncollectibles	21,004	44,191
Depreciation and depletion	‡585,472	1,367,661
Operating profit	502,274	435,313
Margin of profit	8.40%	6.81%
Other income	34,065	41,665
Total income	536,339	476,978
Interest	477,957	513,039
Non-consolidated subsidiary loss	.....	1,508
Federal income taxes	13,250	97,000
Federal surtax	16,750	115,000
Net profit	*28,383	(d)249,569
Times interest earned	1.12	0.93
Earned per share, pfd.	$0.23	....

*Before crediting $24,445 profit on purchase of bonds of corporation (net).

†Including packing, shipping and barge expenses.

‡Computed on basis of cost to predecessor companies, which is also the basis used for federal income tax purposes. If charge for depreciaton in 1937 had been calculated on a book value basis, as in previous years, it would have amounted to $1,329,537. The difference between these two amounts, or $744,066 has been treated as a transfer from the special reserve.

Current assets as of December 31, 1937, including $3,111,419 cash, amounted to $4,720,108 and current liabilities were $424,747 compared with cash of $3,495,961, current assets of $5,141,905 and current liabilities of $575,157 at end of preceding year. Inventories were $1,409,827 against $1,383,394.

Production of the company last year was 1955 bbl. less and shipments 14,146 bbl. more than in 1936, while net sales realization per barrel sold was approximately 10 cents a barrel less, Victor N. Roadstrum, chairman, and Johan A. Miller, president, stated in the joint report. Manufacturing wages, it was stated, now comprise 36% of the corporation's manufacturing costs.

New capital construction in 1937 amounted to $153,852, the larger items being an addition to clinker storage at the mill in Bath, Penn.; improvements at the Des Moines, Iowa; mill and air separators for use in producing a high-early strength cement at the Nazareth, Penn., plant.

MONOLITH PORTLAND CEMENT CO., Los Angeles, Calif., exclusive of subsidiaries, reported for the year ended December 31, 1937, a net profit of $281,067, after all charges including depreciation, amortization, normal federal income taxes and provision for surtax on undistributed profits, equal to $1.92 a share on 146,446 outstanding preferred shares, exclusive of 3,554 treasury shares. This compares with net profit of $185,863, after similar charges, equal to $1.26 a preferred share, reported for 1936.

President Burnett analyzed the company's operations last year for stockholders, drawing comparisons with its operations in 1929. He pointed out that net sales in 1937, at $2,619,100, were 99 percent of the sales in 1929, but that physical volume of products shipped exceeded that of the earlier year by some 37 percent. Sales in barrels were 131 percent of the 1929 total, as contrasted with 132 percent of the 1929 total shown in 1936.

Production and labor costs have advanced considerably, Mr. Burnett stated, and during 1937 were 139 percent of the 1929 figure, with minimum wages advancing from 28c an hour in 1929 to 55c in 1937 and the average last year standing at 72 to 73c an hour.

On a basis of cost per barrel, selling and administrative charges have been reduced substantially, Mr. Burnett declared, average charges for these items of expense running 26.8c a barrel in 1929, as against 20.4c last year.

While the company has suffered some interruption in its business as a result of the recent storm, Mr. Burnett predicted that any losses occasioned will be more than offset by greater demand for the company's products used for repairing storm damage and providing materials for flood control works.

Stockholders approved a proposal of directors that the company's articles of incorporation be amended to authorize the board to purchase common and preferred stock of the company for retirement; and embodied in the resolution was provision for valuation of the company's gross assets at $6,000,000. The resolution provided that purchases may be undertaken at any time, and that "no such purchase of shares shall be made when the withdrawal from the corporation's assets of the sum required to pay the purchase price of the same would operate to reduce the total net assets of the company to an amount below the amount of the capital of the company."

At February 18, 1938, stated value of outstanding capital stock was listed at $3,701,700, consisting of 146,446 preferred shares given an aggregate value of $1,464,460 or $10 each, and 223,724 outstanding common shares given an aggregate value of $2,237,240 or $10 each.

In fixing gross assets of the corporation at $6,000,000 or more, consideration was given to current assets of subsidiary companies, investments in plants, stock holdings in subsidiaries, and investments in limestone deposits. Plant valuation was placed at $2.50 per bbl. of annual capacity, or at $5,000,000. Limestone deposits were valued at $1,300,000. Total valuation of gross assets exceeded by a substantial amount the $6,000,000 figure indicated in the resolution approved by shareholders.

Last year the company called for redemption $591,000 of first mortgage 6 percent sinking fund gold bonds at 105 and accrued interest, and arrangements were made for the private sale of $500,000 of 5 percent bonds. It was stated that only $300,000 face amount of the new issue was sold, the balance of funds required for redemption purposes being provided by a bank loan. The redemption of the 6 percent bonds made possible a change in the company's methods of computing depreciation charges which will enable it to compute such charges in the future on a basis of costs rather than the old basis of appraised values.

NEW YORK TRAP ROCK CORP., New York City, reported for the year ended December 31, 1937, a net income of $33,840 after interest, federal income taxes, provision for doubtful accounts, surtax on undistributed profits, depreciation, depletion, and minority interest, equivalent to $3.06 a share on 11,048 no-par shares of $7 cumulative preferred stock outstanding at end of year, excluding 8952 shares in treasury.

This compares with net income in 1936 of $168,397, equal to 50c a share on 179,890 common shares, after annual dividend requirements on $7 preferred stock.

Current assets as of December 31, last, including $638,221 cash, amounted to $1,841,716 and current liabilities, excluding sinking fund payments on bonds and debentures, were $348,071 compared with cash of $345,611, current assets of $1,673,324 and current liabilities, excluding sinking fund payments, of $334,022 at end of preceding year.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of March 12:

Trunk

36627. **Crushed stone** and **screenings**, in straight or mixed C. L. (will not include agricultural limestone or ground limestone, unburnt; fluxing stone or firestone or stone coated with oil, tar or asphaltum), from Steelton, Penn., to New Bloomfield, Penn., routing via P. R. R., Duncannon, Penn., and S. R. & W. R. R., $1.05 per net ton, in lieu of present combination. Reason—Reflects joint Lycoming scale as increased.

36632. Asbestos **gravel**, refuse, shorts, plaster and finish, also asbestos cement and fibre, from Danville, Warwick and Sherbrook (Ex. Q. C. Ry.) to Cheltenham, Gibson's Points, Penn., same rates as in effect to Philadelphia, Penn., and to Thiels, N. Y., and South Plainfield, N. J., same rates as in effect to New York.

Central

53801. To cancel present rates on (a) **Stone**, broken, ground, gannister, rubble, rip rap, quarry schap, spalls, stone dust, silica rock and firestone, C. L.

(b) **Stone**, artificial and natural (other than granite, jasper, marble or onyx), building and monumental (except carved, lettered, polished or traced stone and grindstone), including curbing, flagging and paving stone; also building blocks made of cement or concrete (not reinforced with metal cement cinder blocks and concrete curbing, C. L., and (c) Stone, tailings, C. L., (see Note 3), from Sandusky and Wakeman, Ohio, to Lannon, Wis., classification basis to apply in lieu thereof.

53812. To establish on **stone**, crushed, in open top cars, C. L., from Kewaunee, Manitowoc and Milwaukee, Wis., to Pittsburgh, Penn., 298c per net ton (proportional rate, applicable only on shipments originating west of Kewaunee, Manitowoc or Milwaukee, Wis.). Routes:

Via P. M. R. R., Toledo, Ohio, B. & O. R. R.

Via P. M. R. R., Toledo, Ohio, C. & O. Ry., Fostoria, Ohio, B. & O. R. R.

Via P. M. R. R., Toledo, Ohio, N. Y. C. R. R., Fostoria, Ohio, B. & O. R. R.

Via P. M. R. R., Toledo, Ohio, W. & L. E. Ry., Monroeville, Ohio, B. & O. R. R.

Via P. M. R. R., Toledo, Ohio, P. R. R.

Via P. M. R. R., Toledo, Ohio, N. Y. C. R. R., Youngstown, Ohio, P. & L. E. R. R.

Via P. M. R. R., Toledo, Ohio, C. & O. Ry., Marion, Ohio, Erie Sys., Youngstown, Ohio, P. & L. E., R. R.

Via P. M. R. R., Toledo, Ohio, N. Y. C. R. R., Martel, Ohio, Erie R. R., Youngstown, Ohio, P. & L. E. R. R.

Via P. M. R. R., Toledo, Ohio, W. & L. E. Ry., Creston, Ohio, Erie Sys., Youngstown, Ohio, P. & L. E. R. R.

Via P. M. R. R., Toledo, Ohio, W. & L. E. Ry., Pittsburgh Jct., Ohio, P. & W. Va. Ry.

53813. To establish on **sand** (except industrial) and **gravel** in open top equipment C. L., from Wolcottville, Ind., to Defiance, Ohio, 85c per net ton. Route—Via Wabash Ry. direct.

53816. To cancel present rates on **sand** and **gravel**, C. L., from Indianapolis, Ind., to Alexandria, Argos, Brice, Clarks Hill, Decatur, Elwood, Ft. Wayne, Hammond, Kingsland, LaFayette, Marion, Michigan City, New Castle, Peru, Rochester, Sharpsville, South Whitley, Thomaston, Valparaiso and Veedersburg, Ind., classification basis to apply in lieu thereof.

53817. To establish on **limestone**, unburnt, ground or pulverized, C. L., min. wt. 60,000 lb. to Moncio, W. Va., from Group 1 points (as shown below), 285c, and from West Columbus and Marble Cliff, Ohio, 245c per net ton.

Group 1 points referred to above as as follows: Carey, Genoa, Gibsonburg, Luckey, Maple Grove, Marblehead, Martin, McVittys, Narlo and Woodville, Ohio.

53819. To cancel rates published in C. & O. Ry. Tariff 2143-D on **limestone**, agricultural (not ground or pulverized); **stone**, crushed, screenings, rip rap, rubble, limestone, ground or pulverized, fluxing, furnace or foundry, melting and/or refractory (unburned), C. L., from Owens, Ohio, to points in C. F. A. territory; C. F. A. I. Tariff 218-K. Item 1700-A, on limestone, agricultural, unburned, in bulk in top cars only; limestone, agricultural (not ground or pulverized) in bulk in open top cars only, and stone, crushed, in bulk in open top cars only; Items 12300-A to 12318-A and 12355 on screenings, crushed stone, in bulk in open top cars and stone, crushed, in bulk in open top cars, from Owens, Ohio, to points in T. L. A. territory and similar rates in other agency and individual lines' tariffs, classification basis to apply in lieu thereof.

53823. To cancel present rates on **sand** except industrial, and gravel, C. L., in open top cars only, from Hobart, Ind., to Brems, Knox, South Wanatah, Thomaston, Tremont, Valparaiso and Wheeler, Ind.; from South Gary, Ind., to Brems, Hobart, Knox, South Wanatah, Thomaston, Tremont, Valparaiso and Wheeler, Ind., and from Hammond, Ind., to Burnham, Chicago and Stony Island, Ill., classification basis to apply in lieu thereof.

53824. To cancel rates on **lime** (calcium), chlorinated lime, bleach or bleaching powder (chloride of lime), in pails or in cans, in boxes or crates or in bulk in barrels, C. L., min. wt., 70,000 lb., from Charleston, W. Va., to North Atlantic ports (for export), published in B. & O. R. R. Tariff I. C. C. 23007, and other individual lines' tariffs, classification basis to apply in lieu thereof.

53837. To establish on **stone**, crushed, also crushed stone screenings, C. L. (see Note 3), from Huntington, Ind., to destinations in the lower peninsula of Michigan on the G. T., M. C., P. M., N. Y. C., Cin. Nor., C. K. & S. and Ann Arbor Railroads, rates on basis of the Kickapoo Scale or Michigan Scale, whichever is higher, plus the Ex Parte 115 increase of 10c per ton.

Routes: Via Wab. Ry., Ft. Wayne, Ind., N. Y. C. R. R., Jackson or Lansing, Mich., G. T. Ry.

Via Wab. Ry., Detroit, Mich., G. T. Ry.

Via Wab. Ry., Ft. Wayne, Ind., N. Y. C. R. R., Lansing, Mich., G. T. Ry.

Via Wab. Ry., Ft. Wayne, Ind., P. R. R., Cedar Springs, Mich., G. T. Ry.

Via Wab. Ry., Ft. Wayne, Ind., P. R. R., Vicksburg, Mich., G. T. Ry.

Via Wab. Ry., Ft. Wayne, Ind., N. Y. C. R. R., Albion, Mich., M. C. R. R.

Via Wab. Ry., Ft. Wayne, Ind., P. R. R., Grand Rapids, Mich., M. C. R. R.

Via Wab. Ry., Romulus, Mich., P. M. Ry.

Via Wab. Ry., Ft. Wayne, Ind., P. R. R., Howard City, Mich., P. M. Ry.

Via Wab. Ry., Ft. Wayne, Ind., N. Y. C. R. R., Lansing, Mich., P. M. Ry.

Via Wab. Ry., Ft. Wayne, Ind., or Adrian, Mich., N. Y. C. R. R.

Via Wab. Ry., Ft. Wayne, Ind., N. Y. C. R. R.

Via Wab. Ry., Alvordton, Ohio, Cin. Nor. R. R.

Via Wab. Ry., Ft. Wayne, Ind., P. R. R., Kalamazoo, Mich., C. K. & S. R. R.

Via Wab. Ry., Milan, Mich., A. A. R. R.

53840. To establish on **sand** (except industrial) and gravel, in open top cars, C. L., (see Note 3), from Elkhart, Ind., to Kentland, Ind., 120c per net ton. Route: Via N. Y. C. R. R.

53853. To establish on **Limestone**, Agricultural, C. L., from Huntington, Ind., to Gilead, 75c and Chill, Ind., 80c per net ton.

53871. To establish on **fullers earth**, C. L., for export, from Olmsted, Ill., to New York, N. Y., 840c, min. wt. 40,000 lb., and 720c per net ton, min. wt. 70,000 lb. (See note.)

53875. To cancel present rates on **limestone** screenings, C. L., from Erie, Penn., to Buffalo, N. Y., Painesville and Perry, Ohio. Classification basis to apply in lieu thereof.

53910. To cancel all rates on **stone**, crushed, slag and/or gravel, coated with oil, tar or asphaltum, from Waterville, Ohio, to destinations in C. F. A. territory other than in Indiana or Michigan. Classification basis to apply in lieu thereof.

54076. To cancel present rates on **plaster** and related articles as described in Item 25, as amended, of P. R. R. Tariff 100-B, from Gibsonburg and Woodville, Ohio, to points in C. F. A. territory and similar rates in other individual lines' tariffs. Classification basis to apply in lieu thereof.

54080. To establish on (a) **sand**, naturally bonded moulding, in all kinds of equipment, C. L.; **sand** (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L. (b) sand, ground or pulverized, in all kinds of equipment, C. L., and (c) **sand** (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L. (see Note A) (see Note 3), but orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb., respectively* from Sandusky, Ohio, group as described below:

(Rates in cents per net ton)

To	Proposed Rates Co. A	Col. B	Col. C
Boston, Mass.	405	441	405
Branford, Conn.	385	420	385
Bridgeport, Conn.	385	420	385
Hartford, Conn.	400	436	400
Hills Grove, R. I.	425	463	425
New Britain, Conn.	395	431	395
New Haven, Conn.	385	420	385
Pittsfield, Mass.	350	382	350
Providence, R. I.	425	463	425
Springfield, Mass.	375	411	375
Torrington, Conn.	395	431	395
Waterbury, Conn.	385	420	385
Worcester, Mass.	390	425	390

Sandusky, Ohio, group, viz.: Avery, Shinrock, Berlin Heights, Ceylon, Huron, Milan, Weyers, Parkertown, Sandusky, Soldiers' Home, Smith Siding, Wilmer and Amherst, Ohio.

Note A—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

54100. To establish on **roofing granules**, C. L., min. wt. 60,000 lb., from Danville, Ill., to Boston, East Walpole, Mass., Stratford, Conn., 540c; New York, N. Y., Genasco, Jersey City, Manville, Maurer, Bound Brook, N. J., Philadelphia, Penn., Edge Moor, Del., 500c; Baltimore, Md., York, Penn., 480c; and Fulton, N. Y., 430c per net ton.

54107. To establish on **limestone**, unburnt, ground or pulverized, C. L., min. wt. 60,000 lb., from Northwestern Ohio Group 1 origins, viz.: Carey, Genoa, Gibsonburg, Luckey, Maple Grove, Marblehead, Martin,

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

**When a shipper orders a car of above mentioned marked capacities or greater and the carrier is unable to furnish car ordered and furnishes a car of greater capacity than that ordered, the min. wt. for the car furnished will be that which would have obtained had the car ordered been furnished and used.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

McVittys, Narlo and Woodville, Ohio, to Aultman, Black Lick, Blairsville, 245c; Cherry Tree, Clearfield, 255c; Dilltown, 245c; Ebensburg, Heilwood, 255c; Idamar, Indiana, Iselin, Josephine, Sagamore, Vintondale, 245c, and Whitney, Penn., 205c per net ton (include Ex Parte 115 increases).

Southern

16395-1. **Fullers earth**, C. L., min. 70,000 lb. Establish 880c net ton, Ochlocknee, Ga., to Minneapolis, Minn.

16431. **Slag**, C. L. Cancel, as obsolete, rates from M. & O. Alabama stations to Mobile, Ala., published as taking Commodity Group 94, page 341 of S. F. T. B. Tariff 131-I. Mileage scale rates to apply.

16454. **Sand**, glass or grinding, C. L. Cancel, as obsolete, rates from Mendota and Silica, Va., to Birmingham, Ala., Hopewell, Va., and various points in W. Va., N. C. and S. C., published in Sou. Ry. I. C. C. A-10629. Class or combination rates to apply.

16464. **Slate**, broken or crushed, C. L. (see Note 1). Establish 522c net ton, Fairmount and Bolivar, Ga., to Edge Moor, Del.

16477. **Mica**, wet ground, C. L., min. 40,000 lb. Establish 34c cwt. from Cranberry, N. C., to Charleston, S. C., and Savannah, Ga., for export.

Southwestern

13221. To establish rate of 50c per ton of 2000 lb. on **sand** (except silica sand) and gravel, C. L., min. wt. 120,000 lb., from Caruthersville, Mo., to Blytheville, Ark.

13283. To establish rates on **bituminous asphalt** rock from Iantha, Mo., to stations in C. F. A. territory in Indiana, Michigan (lower peninsula) and Ohio on basis of scale set out in C. F. A. Circular Letter No. GC-1805 plus 20c, which basis was used from Kentucky producing points to the destinations aforementioned.

13286. **Slag**, granulated or lump, East St. Louis, Ill., to El Paso, Tex. To cancel the rate of $5 per ton of 2000 lb. on slag, granulated or lump, min. wt. 20,000 lb., from East St. Louis, to El Paso, Tex., account no movement.

13307. To establish rates on **feldspar**, C. L., min. wt., 80,000 lb., from Divide, Colo., to Dallas and Ft. Worth, Tex., and Texarkana, Ark.-Tex., 25c per ton higher than the present rates on the same min. wt. from Denver, Colo., to the same destinations; such rates to alternate with rates subject to min. wt. of 50,000 lb.

Western

E-11-34. **Lime**; mortar mix; plaster, calcined; **stucco** and/or wall plaster in mixed C. L. with cement, hydraulic, portland or natural, from, to or between points in W. T. L. territory. Rule: Present—As provided in agency and individual lines' tariffs. Proposed—(a) That W. T. L. Tariff 132-H, L. E. Kipp's I. C. C. A-2538 and W. T. L. Tariff 133-H. L. E. Kipp's I. C. C. A-2473 be amended by including therein a mixed carload rule reading as follows: On lime; mortar mix; plaster, calcined; stucco and/or wall plaster in mixed carloads with cement, hydraulic, portland or natural: Apply to the actual weight of the cement, but not less than 50,000 lb., the applicable carload rate on cement. Apply to the actual weight of lime; plaster, calcined; stucco and/or wall plaster, 3c per 100 lb. higher than the applicable carload rate on cement. Apply to the actual weight of the mortar mix (ground clay) the applicable carload rate on cement.

(b)That Items 192, 195 and 200 of W. T. L. Tariff 207-G and other conflicting items in agency and individual lines' tariffs be canceled.

New England

43709. **Crushed stone**, min. wt. 50 net tons, except that when cars of lower capacity are furnished for the carrier's convenience, the C. L. min. wt. will be the marked capacity of the car, Greenfield, Mass., to Peterboro, N. H. Present—$1.05 net ton. Proposed—70c net ton. Reason—To enable the B. & M. to receive a haul on this material.

Illinois

8310-1. **Stone**, crushed, including chatts, ground ganister, ground limestone, rip rap, rubble stone (rough, broken, irregular pieces, not machined or tooled), also agricultural limestone (not ground or pulverized), in bulk, in open top cars, C. L., from Fairmount, Ill., to Chicago, Ill. Present—Class basis. Proposed—$1.26 net ton, subject to any general increases which may be granted under Ex Parte 115 as result of suspension orders or Ex Parte 123.

Unreasonable Chemical Lime Rates

INTERSTATE Commerce Commission in No. 27469, Virginia Lime Products Co., Inc., vs. Chesapeake & Ohio, by division 3, held that the rate on chemical lime from Eagle Mountain, Va., to Charleston and South Charleston, W. Va., was not unreasonable prior to April 3, 1936, and rates established April 3, 1936, subject to minima of 30,000 to 50,000 lb., also were not unreasonable. However, failure of the defendant railroad to establish on that date a lower rate, subject to a minimum of 70,000 lb., was found to be unreasonable to the extent there was no rate subject to that minimum not greater than 70 percent of the rate established on the same date subject to a minimum of 30,000 lb. Reparation was awarded to the complainant on shipments made on and after April 3, 1936, on which the charges by the car were higher than charges that would have accrued under the findings in this proceeding. A rate is to be established not later than May 19 on the minimum and basis shown in the report to be established to Charleston. The rate and minimum are in accordance with the adjustment ordered by the Commission in Ohio Lime Manufacturers vs. Pennsylvania, 214 I. C. C. 417.

Reopen Pulverized Limestone Rates

PULVERIZED LIMESTONE rates are being investigated by the I. C. C., particularly as they relate to whiting or whiting substitutes, due to the large number of complaints which have recently been filed. No. 27612, intrastate rates on whiting in New Jersey, has been reopened for further hearing in connection with No. 27921, Southwark Manufacturing Co. vs. Pennsylvania-Reading Seashore Lines et al. and a sub-number thereunder, United States Rubber Products, Inc., vs. Same. Other proceedings that have been reopened on similar complaints are No. 25220, American Lime & Stone Co. et al. vs. Pennsylvania et al.; No. 24757, Limestone Products Corporation of America vs. Lehigh & Hudson et al.; No. 24432, Washington Building Lime Co. et al. vs. Atlantic City Railroad et al.; and two sub-numbers thereunder, Same vs. Baltimore & Eastern et al. and Warner Co. et al. vs. Atlantic City Railroad et al.

Pennsylvania Cement Rates Not Unreasonable

INTRASTATE FREIGHT RATES in Pennsylvania on cement in carloads maintained by certain carriers on order of the Pennsylvania commission, from Neville Island and Universal, Penn., to destinations in the Pittsburgh area were held by Examiner David T. Copenhafer of the I. C. C. not to give unreasonable preference or prejudice as between persons or localities in intrastate commerce on the one hand, or interstate commerce on the other, or unjust discrimination against interstate commerce. It was therefore recommended that proceedings No. 27768, cement (Neville Island) P. & O. V. Junction and Universal, Penn., to Pittsburgh, Penn., to be discontinued.

The Pennsylvania commission had required the carriers to establish rates from Neville Island and Universal, Penn., into the Pittsburgh district, for hauls not exceeding 50 miles on a scale much lower than the one used as a result of Atlas Portland Cement Co. vs. C. B. & Q. 81 I. C. C. 1, that scale being known as No. 12710, which begins with a rate of 6.5 cents for five miles and less, while the Pennsylvania commission scale begins with a rate of 3 cents. The 12710 scale for 50 miles prescribes a rate of 8 cents, while the Pennsylvania scales prescribes a rate of 7.5 cents. Trunk lines had instituted the proceeding before the I. C. C., claiming that an annual revenue loss of $45,273.60 resulted from the Pennsylvania commission rates. The Examiner for the I. C. C., however, pointed out that an increase in rates very often did not result in an increase in revenues. If the tonnage moved by truck the railroads would lose all the anticipated revenue from the higher rate.

New Wage Bill

A NEW WAGES-HOUR BILL is now before Congress. This legislation, sponsored by the A. F. of L., proposes a minimum wage of 40 cents an hour, a maximum work week of 40 hours, no geographical differentials, no machinery for the enforcement of the program and bans child and convict labor.

Silica Deposit

NEAR CAMBRIDGE, NEB., on the Mousel Ranch, there has been discovered a silica sand deposit said to be 8-ft. deep, covering 35 acres. Angeline L. Minn of Central City, Colo., has a lease on the silica deposits. Assay tests indicate that the silica is of excellent quality.

NATIONAL ASSOCIATION *Activities*

Lime

NATIONAL LIME ASSOCIATION'S construction engineer, Lee S. Trainor, suffered a stroke of paralysis shortly after driving his family to Braddock Heights, Maryland, February 22, on a visit to his recently completed summer home. He was taken immediately to the Frederick City Hospital, Frederick, Md., where during the first few days his condition was extremely serious. Although Mr. Trainor has not recovered the use of his left arm and leg, his general condition has improved to the extent of permitting his removal from the hospital on March 6. He is now under the care of Mrs. Trainor and a practical nurse at his home in Braddock Heights. His address is Box 107-A, Route 5, Frederick, Md.

• • •

The agricultural department of the association now has a series of eight folders, copies of which are available to members and others interested at very reasonable prices per thousand. These folders are entitled: "Soil Acidity"; "Lime for Truck Crops"; "Raise More Legumes"; "Lime Hints for the Home"; "Better Pastures"; "Penalty of Delay"; "Fall and Winter Liming" and "How to Apply Lime."

• • •

The construction department of the association is continuing the series of meetings for architects, engineers, builders, and representatives of lime manufacturers. A very successful one was held in Philadelphia, March 11. Prof. Walter C. Voss, of Massachusetts Institute of Technology, discussed the subject "Why Masonry Walls Leak" before a group of interested listeners numbering approximately 360. Although it was a luncheon meeting, questions from the floor which were answered by Professor Voss consumed the time until 4:00 p.m. when about 60 percent of the original audience still remained.

A similar meeting was scheduled for March 25 at the Commodore Hotel in New York City. Replies to invitations sent out indicate a probable attendance of 350.

Other meetings in process of development include Houston, Tex., April 2; San Antonio, Tex., April 4; Chicago, Ill., April 6; and Cleveland, Ohio, April 7.

On the evening of March 25, John Stockett showed the Association's talking slide-film "Water-tight Unit Masonry" to a group of designers and engineers at the Architects Square Club, 2 Park Avenue, New York City.

Coming Events

NATIONAL Lime Association will hold its annual convention at the Netherland-Plaza hotel, Cincinnati, Ohio, May 9, 10 and 11.

• • •

NATIONAL Industrial Sand Association, annual meeting at Zanesville, Ohio, May 11 and 12.

• • •

AMERICAN Society for Testing Materials, annual meeting at Atlantic City, N. J., Chalfonte-Hadden Hall hotel, June 27 to July 1.

Convention Date

NATIONAL INDUSTRIAL SAND ASSOCIATION, through V. P. Ahearn, executive secretary, has announced the date of the annual meeting at Zanesville, Ohio, as May 11 and 12. As to the program, Mr. Ahearn states: "The outline calls for a discussion of questions of paramount interest to the whole industrial sand industry. Without undertaking to refer to these in detail, let me say that it will include such matters as the following: engineering control of the dust hazard at points of consumption of industrial sand; formulation of codes by State authorities which regulate the use of the products of our industry; the medical phases of dust control; a review of developments during the past year in the field of freight rates and the prospects for the immediate future; reports by committee chairmen, and reports of officers and the staff; Federal and State legislation of direct interest to the industry; more adequate representation of the industrial sand industry on various committees of technical and professional societies whose work involves the handling and the use of industrial sand."

• • •

William W. Collins, Jr., traffic council for the Association, has advised Secretary Ahearn that the net result of the I. C. C. rate decision as it affects industrial sand "is a 10 percent increase in present rates, to be effective probably about April 1. That much can be stated definitely. As to a 20-cent or any other increase to take the place of what our sand did *not* get last December under Ex Parte 115, I can only conjecture that the carriers may not press for it; that they may not get it even if they do make the effort; and that in any event it would be a matter of at least several months before such increase, if allowed, would be effective."

Crushed Stone, Sand and Gravel, and Slag

COMMENTING on the decision of the I.C.C. in the 15 percent case (Ex Parte No. 123), Executive Secretary Ahearn, of the National Sand and Gravel Association, who presented a joint case for all the mineral aggregate associations, has this to say: "If it did nothing else, it demonstrated conclusively the futility of these Ex Parte proceedings. They do not solve the revenue problems of the carriers, and they fail to take into account the impracticability of imposing a horizontal increase on existing rates irrespective of the traffic and transportation characteristics of the individual commodities; and in the instance of industries with substantial intrastate movements, the failure to achieve coordinated action places interstate shippers at a severe disadvantage.

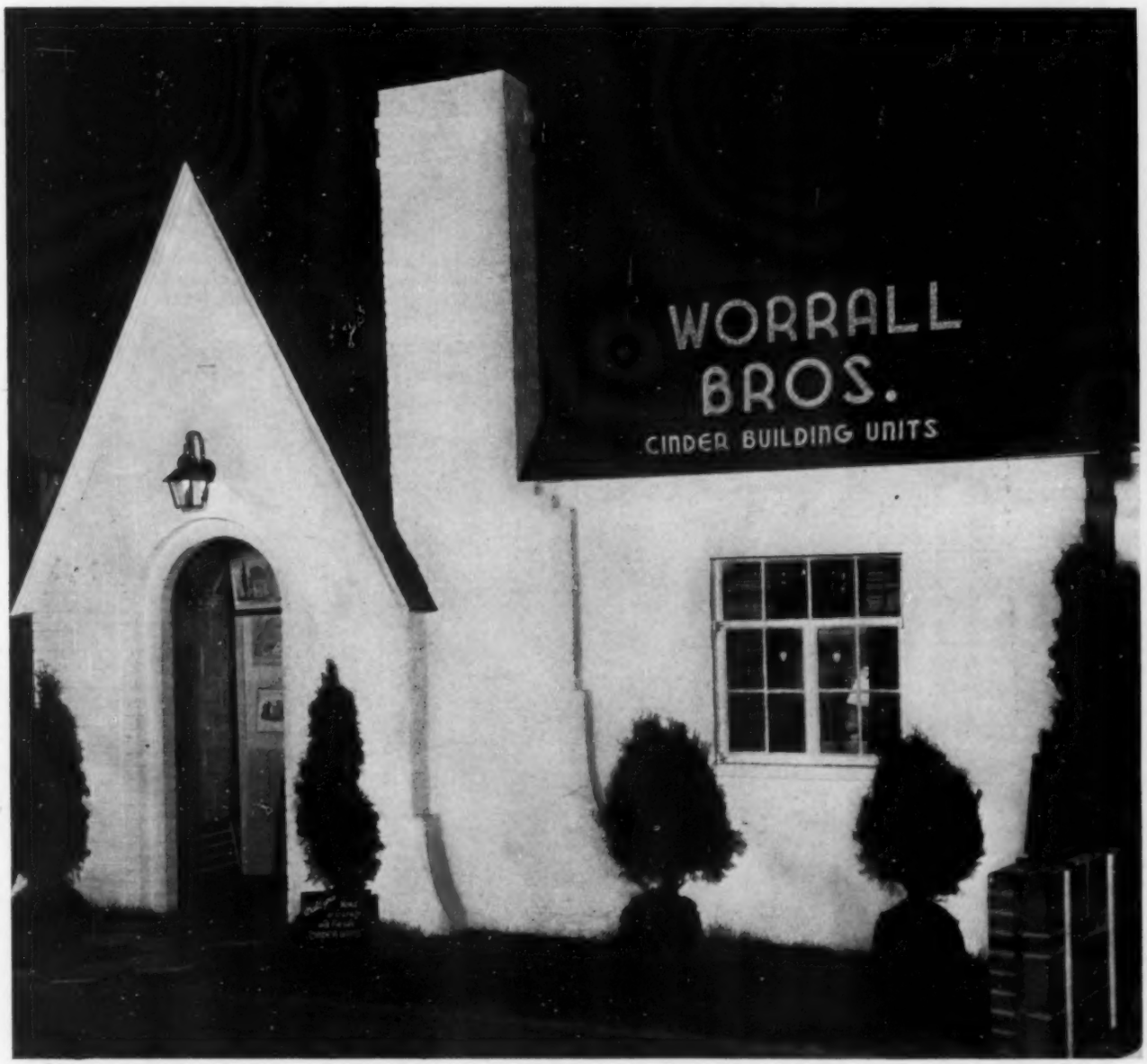
"The Commission denied the application of the carriers in Ex Parte No. 123 for a super-imposed horizontal increase of 15 percent in all rates, but it did conclude that with the exception of a very few commodities, an increase of 10 percent could be assessed by the carriers, with the proviso, however, that the increases authorized in Ex Parte No. 115 must be taken into account. In other words, the cumulative feature of the proposal of the carriers was denied. Perhaps it will assist in understanding the effect of the Commission's action if we selected specific rates for the purpose of illustration.

"In Ex Parte No. 115, the carriers were authorized to impose the following increases in rates on sand, gravel, crushed stone, and slag: an increase of 5 cents on all interstate rates from 61 cents to $1.00 inclusive; an increase of 10c on all interstate rates of $1.01 or more; and no increase on rates of 60c or less. In coöperation with the National Crushed Stone Association and the National Slag Association, we filed a request for suspension of the tariffs incorporating these increases, but that request was denied

(Continued on page 79)

Concrete Products
Cement Products

Home Show Displays Bring Results



Model home displayed by Worrall Bros., at Louisville, Ky., Home Show, constructed with cinder block units, ashlar pattern, and cinder concrete brick to show how fire-safe residences are built. This display resulted in the construction of a number of concrete masonry houses

Rebuilding Main Street...

IS A JOB FOR

CONCRETE MASONRY

Watch the small commercial building market! It's coming back fast, and untold thousands of new stores, garages, banks, and neighborhood "business corners" will soon be built as communities expand.

For this class of building concrete masonry has everything—firesafety . . . permanence . . . low cost . . . and a surprising new and untold *beauty* story! These pictures give just a glimpse of what you can do, largely with standard units. Now is the time to line up architects and builders who have new ideas, and go after this hot market.

PORTLAND CEMENT ASSOCIATION

Dept. M-45, 33 W. Grand Ave., Chicago, Ill.

●

Three attractive buildings at Orlando, Fla. Designed by Raymond C. Stevens. Built by Kiehl & Stevens. Concrete masonry supplied by Pittman Builders Supply Co. and Newell Block Co.

Lower left view shows one of numerous recent examples of concrete masonry at Fort Worth, Texas. Built by C. S. Radford. Concrete masonry furnished by Chase Building Products, Inc.

Make the Public "Concrete House" Conscious

HOME SHOWS BUILD BUSINESS

FIFTEEN CINDER CONCRETE masonry homes were constructed in Louisville, Ky., in 1937, directly as a result of an attractive display exhibited at the Annual Louisville Home Show, by Worrall Bros., manufacturers of concrete and cinder concrete products, producers of sand and gravel and building supply dealer.

Cinder concrete was unknown to Louisville as a building material until four years ago when it was introduced by Worrall Bros., and it was not until after the 1937 home show that these units were used for construction of residences.

In the interval contractors, architects and builders had been sold on the merits of lightweight concrete units for backup and partition purposes in large and small structures other than homes. This type of construction was built up largely by direct contact, since cinder concrete masonry had been "unheard of" as a building material.

According to M. M. Worrall, cinder concrete masonry just could not be put over for residence construction until public interest was created. It was not sufficient to show individual units and explain their peculiar properties. The public had to be shown in a wall section just how a cinder block house would look when erected, how plastering would be applied and other structural features.

House Model Creates Public Interest

To carry out this plan at the May, 1937, Louisville Home Show at the Jefferson County Armory, Worrall Bros. contracted for space and constructed a cinder concrete masonry house in part, sufficient to show a complete front and exposed walls within, so that visitors could closely inspect construction details.

In July of that year the first concrete house was put under construction as a direct result of the exhibit, and in all 15 residences of various sizes were built in the last six months of 1937.

In 1938, sponsors of the show, the Louisville Real Estate Board, invited Worrall Bros. to build the Example, or Model House of cinder masonry units. This, of course, was the main attraction of the show and the opportunity was offered due to the great interest shown in cinder masonry the previous year.

Officers of Worrall Bros., Louisville, Ky. Left to right: Ed. Buscher, sales manager; M. M. Worrall, general manager; and Al Krebs, office manager

Instead of building a model house, Worrall Bros. built a display similar to that on exhibit in 1937, consisting of an English style front, 20-ft. in width, and having standard doorways for the convenience of visitors. The end walls of the house extended back from the front about 10 ft. to give a finished appearance to the exterior.

By having an unfinished house, the cost was cut considerably and every detail of the construction could be properly shown. The wall around the front doorway was of random ashlar design, the chimney was of cinder concrete brick and the remainder was of 8- x 8- x 16-in. cinder concrete units, with the vertical mortar joints troweled over. The house was painted with a white oil base paint which did not conceal the coarse texture of the units.

This display was erected at a total cost of $500, including the space rental and, according to Mr. Worrall, had an advantage over a model house in that people did not have to be hurried through and there was sufficient time to discuss concrete houses with those interested. Many of the architects and contractors were present at the show, of course, and they also evidenced interest in the permanence of concrete masonry construction.

Loan Companies Become Interested

Representatives of leading loan companies were called upon by members of the company and others were contacted by mail during the nine-day show, February 25 to March 5, inviting them to come to see the display of concrete masonry. As a result of this activity five loan companies have become interested in this class of construction and stand ready to offer loans for concrete residences. Great interest was shown in the 1938 display and many live prospects were obtained. Shipments of cinder concrete units were being made the first week after the show for the first concrete house of 1938, and, according to Mr. Worrall, many live prospects are telephoning or calling at his office each day.

One prospect has even requested that he be allowed to copyright the design, which was original, and use it to erect a chain of sandwich shops. Each of the prospects is, of course, referred to the loan companies, architects and builders who have been convinced of the merits of cinder concrete masonry construction.

To help sell the architects and builders who had had no previous experience with concrete houses, Mr. Worrall sponsored an automobile trip to Cincinnati, Ohio and Indianapolis, Ind., to show them just how sound and attractive a concrete house could be.

Build Modern Products Plant

To properly service demands for concrete residences and other structures, a modern and efficient cinder crushing and handling plant was built several years ago and a vibrating table was set up for the manufacture of precast joists.

A good grade of cinders is available, which are delivered by rail to the com-

Typical of the fine type of residences being built in Louisville, using cinder concrete block units

pany's railroad siding at the sand and gravel plant. Here they are stockpiled and reloaded by crane into trucks for delivery to the concrete products plant, which is less than a mile distant.

From the unloading hopper, a Link-Belt bucket elevator raises the cinders to a short belt conveyor equipped with a Eureka magnetic pulley to remove tramp iron. The cinders then pass through a New Holland 24-B hammer mill and a New Holland 10- x 16-in. four-roll crusher.

Crush Cinders To Improve Product

The crushed cinders are then passed over a 12-in. inclined belt conveyor to a home-made, single-deck vibrating screen, and a separation of coarse and fine aggregate is made over a screen with $\frac{3}{8}$-in. square openings.

Coarse and fine cinders are shoveled into a skip bucket and cement is added in the bucket for delivery overhead to a Besser 14-cu. ft. mixer. Concrete block are manufactured by a Besser automatic Victory stripper. Capacity of the machine is six standard 8- x 8- x 16-in. cinder blocks per minute, or 72 concrete brick.

Six 8- x 70-ft. curing kilns were built recently, open at one end only, to eliminate all drafts. In the winter, live steam is injected into the kilns, supplemented by dry heat from coke salamanders. High early strength cement is used only in the manufacture of precast concrete joists.

Units carried in stock are only those needed to fully service the types of construction being sold. Among them are standard units in 3-, 4-, 6-, 8- and 12-in. widths, fractional units, all ashlar sizes, sills, copings and eight sizes of lintels. Miscellaneous products manufactured include: concrete flower pots, columns, flower boxes, benches and concrete tile.

Practically all sales are made by direct contact and little dependence is placed on direct mail and advertising. In addition to the office sales force, a salesman is employed to sell and service the adjoining counties. Occasionally advertising is carried in local papers to tie in with some outstanding structure being described editorially. M. M. Worrall is general manager of the company, Ed. Buscher is sales manager, and Al. Krebs is office manager of the company.

Construction Up

F. W. Dodge Corp., New York, N. Y., recently reported that construction contracts awarded in 1937 aggregated $2,913,060,000 compared with $2,675,296,000 in 1936, an increase of 9 percent. All classes of construction, except public works, shared in the improvement. Residential building rose 13 percent to $905,292,800, the highest since 1930; non-residential building amounted to $1,148,172,600, an increase of 20 percent; public utility contracts rose 34 percent to $277,730,000; and public works contracts totaled $581,864,500, a decrease of 19 percent. T. S. Holden, vice-president of the corporation, in reporting on conditions, said that the figure for residential building for December did not include any of the 35 large-scale housing developments to cost approximately $119,000,000 for which working plans are in progress.

In the Progress Edition of *The Alpena News*, dated February 25, the rock products industries and allied manufacturing interests take a prominent place as major factors in the prosperity of Alpena, Mich., and surrounding territory. The various industries are described in detail and interesting views of plants are illustrated. Cement block companies in their advertising urged home owners and prospective builders to use cement blocks for construction purposes. The Michigan Alkali Co., Thunder Bay Quarries Co., Kelley Island Lime & Transport Co., and the Besser Manufacturing Co., are prominently mentioned in this issue. The Alpena Cement Products Co., and the A. B. Crow Memorial Co., are referred to in this issue as progressive producers of concrete block, concrete burial vaults and other types of concrete products.

Storage yard and plant. Note the extensive stock of cinder concrete block and special sizes which are kept on hand to meet every demand

How Aggregates Affect the Design and Control of

CONCRETE MIXTURES

By MILES N. CLAIR*

MANY ARCHITECTS, engineers, contractors, and material producers have not become familiar with principles known for nearly 20 years to fully use or accept them. As a result the architect or engineer continues to specify his concrete on the basis of arbitrary proportions and his aggregates in terms of a maximum size and a general statement of "uniformly graded from coarse to fine."

Under such a specification, the contractor estimates costs on the basis of past experience or tables of quantities made up many years ago, probably without reference to the characteristics of the aggregates used in the particular locality. As costs are a very important factor with contractors, the aggregates producer submitting the lowest price for the material, meeting the specification, will get the business. This condition sometimes results in the delivery of aggregates to the job which are not up to specification. Unless there is poor workability affecting placement or poor strength affecting stripping, no objection will be offered. Honeycombed areas may have to be patched, but the disintegration will not show up until later.

Obsolete building laws also offer an obstacle. These laws set up properties and gradation requirements on a basis which recognizes no deviations, and very often the ratio of coarse to fine is so definitely fixed and the gradation left so wide open that enforcement of the law results in poor rather than good concrete. To improve the quality of concrete generally produced, there should be a wider distribution of information concerning concrete quality, good specifications, proper design of concrete mixtures, careful control of concrete proportioning, mixing, placement, and curing. Specifications for concrete, like the new Joint Committee Report, are now avaliable to architect or engineer for use on any size job.

Some question has arisen as to the reasonableness of tolerance in specifications similar to those of the Joint Committee. The tolerance is given as ± 0.2 in the fineness moduli. Experience has shown that a tolerance about twice as great would more nearly meet the condition normally met with in material delivered by producers. In controlling the workability of concrete, however, the tolerance of ± 0.2 is not sufficiently close.

Assuming that the acceptable representative sample of fine aggregate came within the gradation specifications and had a fineness modulus of 3.1, it is probable that the sand was really at the critical point in regard to the amount of material passing the No. 50 sieve. If the fineness modulus went to 3.3, there would be a decided change in workability, requiring a change in the entire mixture set-up. From experience of this kind, it is believed that tolerance in the fineness modulus of fine aggregate must be within ± 0.1 if uniform concrete is to be produced at any plant where concrete is being batched rapidly. The same limits also are necessary for the coarse aggregate, and should be included in standard specifications.

Miles N. Clair

To meet such a specification, the producer of aggregates must be more careful not only as to washing and screening but also in working his bank. Some difficulty is often experienced because of the divergence of specifications as even nationally used specifications do not exactly agree although they are approaching one standard. In different local areas, however, they deviate widely, one engineer deciding he wants a maximum size aggregate, ranging from ¾-in., another 1-in., and still another 1½-in. for the same purpose concrete. One wants a straight line grading on a regular scale plotting, another a straight line on a semi-log scale, and a third may want the material all one size. It is of course desirable for both producer and user that there be as few sizes as possible, and a grading that will produce economical concrete and make use of the characteristics of the aggregates available in each locality. In any metropolitan area, there will be needed at least four or five sizes of coarse aggregate and two sizes of fine aggregates. By combining the three sizes of coarse aggregates most of the specifications can be met, provided the maximum size is not over 2-in.

Ideal Gradation

Experience indicates the best results in concrete are obtained where the aggregate grading percentages passing a given sieve are plotted to a uniform scale and the size of the sieve openings to a log scale. This approaches a straight line on a semi-log plotting, and agrees closely with the ideal grading recently presented in one of the news letters of the National Sand and Gravel Association.

However, it is sometimes difficult and costly to follow an ideal gradation. If the sand in a local area naturally runs to the fine side of an ideal gradation curve and the gradation of the coarse aggregates is normal, a little less sand should be used; if the sand is on the coarse side, more sand should be used. Deviations from the ideal curve result in an increase in the cement content and a change in the ratio of coarse to fine aggregate, but the change in cement content seldom is as much as 10 percent.

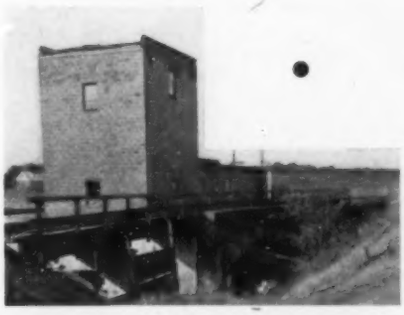
If a sand is deficient in fines, very often admixtures are needed to correct the deficiency. This is an opportunity for the aggregate producer in this territory to improve his material and obtain the premium of 15 to 25 cents per cubic yard which goes to the admixture producer. This may be done by locating a deposit nearby with a high percentage of fines which in combination with the coarse sand will provide the desired gradation.

*Abstract of an address by Mr. Clair, vice president and treasurer, The Thompson & Lichtner Co., Inc., before the National Sand and Gravel Association convention at Cincinnati, Ohio.

Track Over Roof For Unloading Aggregates

NEW PIPE CURING SYSTEM

By BROR NORDBERG



Concrete pipe plant having railroad tracks directly over roof of aggregate bins

A NEW PLANT designed for the manufacture of all types of concrete pipe went into production in St. Louis, Mo., in October, 1937. This plant is one of several manufacturing units located in the central states by Independent Concrete Pipe Corp., Inc., whose general offices are in Indianapolis, Ind.

Power equipment for the manufacture of 8- to 54-in. diameter reinforced pipe has been installed in an ideal location; a 100- x 210-ft. plant formerly occupied by a concern manufacturing cinder concrete masonry units.

At the time the plant went into production it probably differed from the average plant, only in the way the aggregates are brought in and handled and in the method of curing.

Advantage was taken of existing aggregate unloading facilities, used by the former occupant of the building, to eliminate elevating the materials.

Merrimac river sand and gravel aggregates used in the manufacture of all pipe are generally brought in by rail, although trucks are sometimes used. The railroad main line elevation is the same height as the roof of the adjacent plant building, and a spur track allows the loaded railroad cars to actually run out over the roof of the plant, the reinforced concrete columns in the plant being designed to withstand heavy stresses.

Railroad freight cars are of the bottom-dump type and discharge directly into the plant bins, which are inside the building and below the track. The plant has five inside partitioned bins of 100 tons total capacity and two additional outside bins.

Aggregates are transferred by wheelbarrow to a Besser 21-cu. ft. mixer, set in a pit below the floor level, and are elevated to the discharge chute of the pipe machine by a 21-cu. ft. skip bucket. Pipe are manufactured on a new tamper pipe machine manufactured by the Universal Concrete Pipe Co., Columbus, Ohio. Pipe are cast one at a time on a single turntable.

The turntable is driven by a 20-hp. motor through a Reeves variable speed drive. A 15-hp. motor drives the mixer, a 10-hp. motor drives the skip hoist and a 3-hp. motor drives the feeder. Two 3-hp. motors drive the two tampers and a third one operates the core hoist.

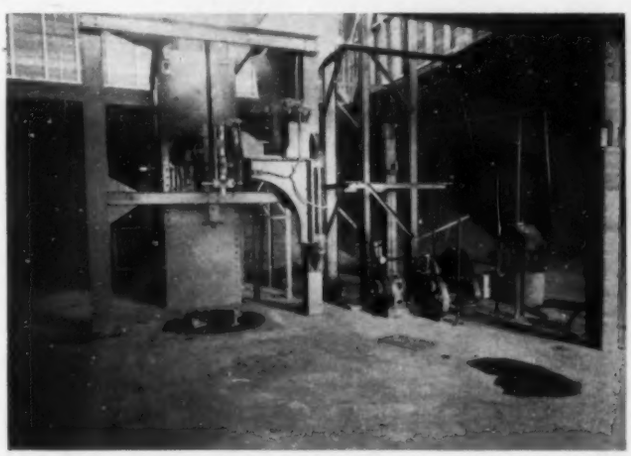
The building is laid out to allow 6500 sq. ft. of curing space, and in addition four acres of land are available for outside curing and storage.

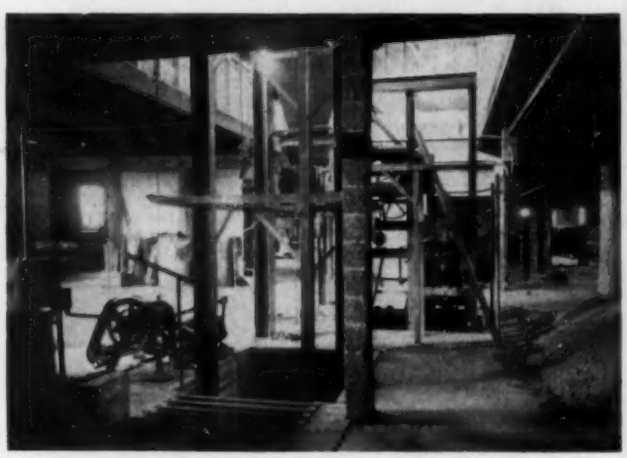
Pipe are to be inside cured, both summer and winter, but the method of curing is designed to meet conditions.

To meet these conditions, a combination curing system of sprinkling and hot air has been substituted. A 22-hp. boiler was installed to develop the necessary heat, and two blower-type fans are installed in each kiln to circulate the heated air over the concrete pipe, which are sprinkled at regular intervals.

ROCK HILL PRE-CAST CONCRETE CORP., St. Louis, Mo., is reported to have purchased the assets of two other St. Louis concerns manufacturing cast stone. A new enlarged plant is under construction at the present plant site of the company.

STANDARD SLAG CO., Wheeling, W. Va., suffered a loss of $40,000 to buildings and equipment by a fire which recently swept through the plant. Difficulties encountered by the city fire department in reaching the fire due to construction work were said to be responsible for the large damage. The fire was brought under control by pumping water from a river steamboat owned by the Wheeling Steel Co., and water pumped from a steam engine tender.





Left: New pipe machine for pipe up to 54-in. in diameter and 8-ft. in length. Right: Side view of pipe machine. Aggregate bins are to the right, and the mixer is below the floor level

Concrete Brick Factory

PRODUCTION has started at the new $8000 concrete brick factory in Bowling Green, Ky., adjoining the Rhea Price property on lower Woodford St., with S. R. Russell as manager of the plant. Production will be approximately 7000 standard brick or 2000 special building block per day. Manufacture of a special glazed, fire-resisting brick will be begun soon after production of the standard product is under way. Crushed stone aggregate will be used.

Ready-Mixed Plant

THE VINITA READY-MIX CONCRETE CO., Thompson and Flint Sts., Vinita, Okla., recently started operations with W. A. von Unwerth and F. B. von Unwerth as partners in the new enterprise. A warehouse and batching plant has been erected north of the Ives Lumber Co. on the Frisco right-of-way. The proposed large building program for this city prompted the action of the von Unwerth brothers in erecting the new plant.

A MURAL PAINTING depicting workers in the cement industry was recently completed for the section of painting and sculpture of the United States Treasury Department by Ryah Ludins, gifted woman painter, who specializes in industrial subjects. She was commissioned by the Mexican government to paint some murals, and as part of her work went into the mines to a depth of 1400 ft. to make sketches for her painting. One of her murals, depicting the cement industry, is in the Post Office at Nazareth, Penn.

New Pipe Plant

ONTARIO CONCRETE PIPE CO., Ontario, Idaho, is erecting a new plant which will double present capacity. The new structure is expected to be ready about May 1. Claude Bingham, Caldwell, Idaho, is president; Mrs. Bingham is vice-president; and Earl Bull is manager, and secretary-treasurer.

Minimum Coal Prices Thrown Out

CHALLENGED SUCCESSFULLY by several court injunction actions, the Guffey Coal Act Commission decided that it would be impossible to use any of the price minima and in a formal resolution announced that the entire schedule had been withdrawn and that new public hearings would be held. The various court decisions have held that the minimum prices were discriminatory, that public hearings on the new rates were not held as provided for in the Act, and that they were confiscatory in some cases. It is believed that it will take several months before new minimum prices will be placed in effect. The constitutionality of the entire act also has been brought into question, and undoubtedly will be carried to the Supreme Court for decision.

Wages Ahead of Prices

WAGE RATES during 1937 were 137 percent of the 1926 average and prices during 1937 were 87 percent of the 1926 level, said J. S. Young, president of Lehigh Portland Cement Co., in the annual report of the company. Production and shipments in 1937 were approximately the same as in 1936. The increase in costs was attributed mainly to the higher level of wage rates, and the shrinkage in average mill net was said to be the direct result of drastic reductions in price along the Atlantic and Gulf coasts to meet foreign competition.

GULF OIL CORP., Pittsburgh, Penn., has been printing a series of beautifully illustrated brochures covering various industries in which are described the principal operations, equipment, and lubrication problems. Brochures have been printed on cement, roofing manufacture, and another is to appear on granite quarrying.

Unique Heating System for Ready-Mixed Concrete

ACCURATE CONTROL OF MIX

By BROR NORDBERG

WINTER OPERATIONS of ready-mixed and central mixing concrete plants have their limitations in cold climates, and many plants have tried and are experimenting with various methods of heating aggregates, water, or both, with varying degrees of success.

After years of experimentation the Fred Schmitt Material Co., St. Louis, Mo., a large, long established producer decided on a definite practice of heating sand and gravel in bins and the mixing water. The plant is now equipped to furnish pre-mixed concrete under below-zero weather conditions, the only limitation being facilities for handling concrete at destination.

Aggregates are shipped in by rail and placed above the weighing hopper in six bins of 1500 tons total capacity. The plant is entirely enclosed, including the bins, except for open tops.

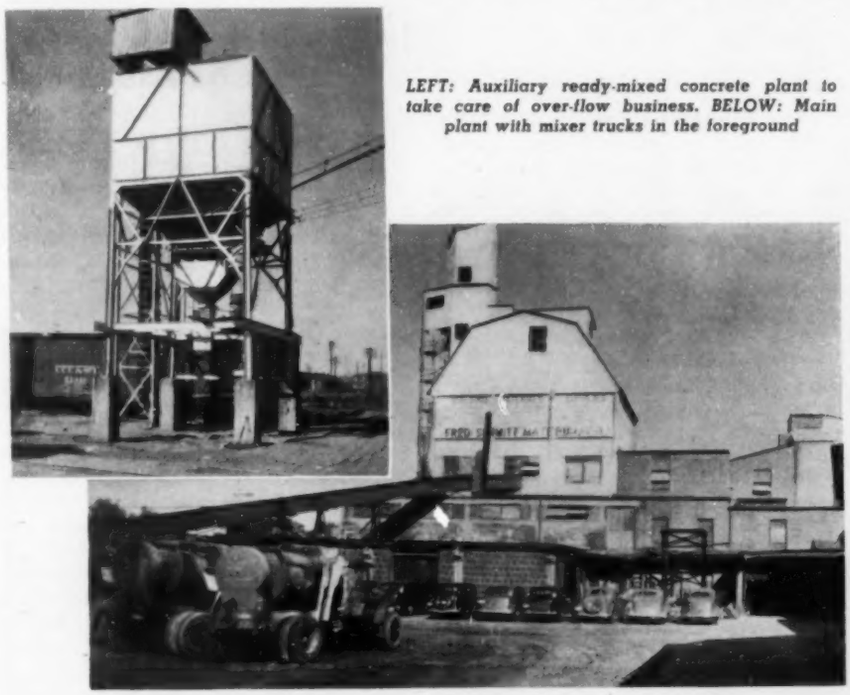
Various combinations of steam coils in the aggregate bins had been tried with indifferent success, but the company finally settled upon the release of live steam through jets spaced in the bottom of bins, for heating of sand and gravel, and instantaneous heating of mixing water.

A 35-hp. low pressure boiler, fired by oil, furnishes the steam to heat both water and aggregates. Steam at 7 p.s.i. pressure is injected into the bottom of each bin through ¾-in. diameter pipe extending into the bins about six feet.

Three jets are needed in the gravel bins to keep a constant temperature of 130 deg. F. in the gravel discharged into the weighing hopper, and six jets are used in the sand bins, sand being much more compact and resistant to the transfer of heat. Sand temperatures are maintained at 60 deg. F.

The temperature of the mixing water is raised to 130 deg. F., the maximum permitted for specification concrete in the St. Louis area, by instantaneous heating in the main from live steam in 1¼-in. diameter copper tubing. The length of tubing is calculated so that the required volume of water may always be drawn at 130 deg. F. This water is weighed in the automatically-operated mixing water measuring tanks. A 110-gal. pre-heater tank is also provided as an emergency source of heated water.

Apart from developing a satisfactory winter operation, other interesting operating features have been developed over a period of years. New methods of handling and weighing aggregates have been introduced this past year.



LEFT: Auxiliary ready-mixed concrete plant to take care of over-flow business. BELOW: Main plant with mixer trucks in the foreground

Methods of Handling and Weighing Aggregates

Plant design is incorporated around two 2½-cu. yd. open-top revolving blade-type mixers, and deliveries are made in agitators while in transit. The agitators may be operated as truck mixers and are being exclusively used as such in connection with a new ready-mixed concrete plant built in 1937 to take care of the business overflow. Twenty-five trucks are equipped with bodies rated at 1½-cu. yd. when used as mixers and 2-cu. yd. when used as agitators in making deliveries. The mixers, or agitators, have a side-dump feature as well as the conventional end discharge. After aggregates have been placed in the bins, the central mixing plant is a gravity plant throughout. A system has been introduced whereby the operator has under his control the entire plant operation, including proportioning and mixing. Many time-saving devices and methods also have been developed to increase the general plant efficiency.

To simplify the weighing of aggregates and expedite their delivery to the two cement mixers below, a large single weighing hopper was installed in 1937 in which the various aggregates and cement are weighed individually and the entire charge is dumped to the mixers.

Tally sheet, 4- x 5¼-in., filled out in the office and used by truck drivers to order ready-mixed concrete

Previous practice was to weigh out each aggregate into separate hoppers.

Generally, aggregates are released directly from bins to the hopper by a system of pulleys which operate the bin gates by means of levers controlled by the man on the mixer floor. When necessary, this man can load the hopper from the outer bins by starting 20-in. belt conveyors on 20-ft. centers. Aggregates are weighed in the hopper by a new 3-beam Toledo scale, the final scale reading being the sum of the weights of the several aggregates placed in the hopper. When the hopper is tripped, discharging into the mixers, the indicator hand returns to zero. Cement in sacks is delivered to the mixing floor from a warehouse, over a 22-in. belt conveyor on 120-ft. centers.

Individual, automatically - operated mixing water tanks have been designed to accurately weigh out and deliver water into the mixers. The water supply can either be taken from the mains at city pressure or is furnished through a 4-in. line by compressed air from a well on the company's property. A 9000-gal. tank carries the reserve supply of water.

Each water-measuring tank is large enough to hold sufficient mixing water for making 3-cu. yd. of concrete. The operation is simple. The scale is set for the desired weight of water, the water is introduced, and when the proper amount has run into the tank a solenoid switch shuts it off. The operator turns a valve and the water discharges into the mixer.

Unique Truck Loading System

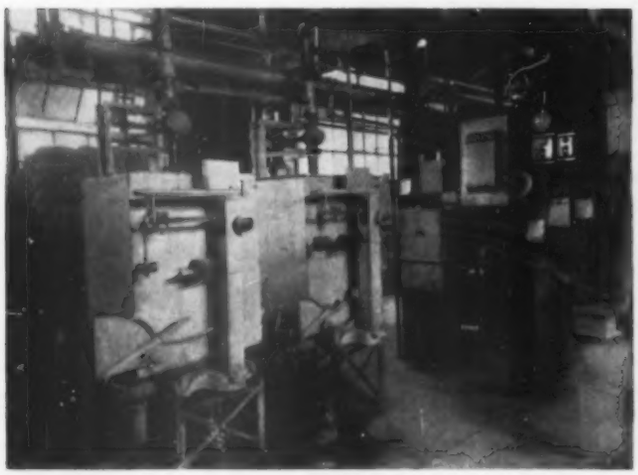
A number of "kinks" have been developed to expedite the loading of trucks and their departure from the plant, the operator from his station not being able to see the trucks. The system is as follows: Each truck has a number. When the driver has a delivery to make, he goes to the plant office and gets a slip of paper on which is indicated the exact weights of ingredients for the particular order he is filling, complete with the name of the customer and driver, the date, the total load and the truck number.

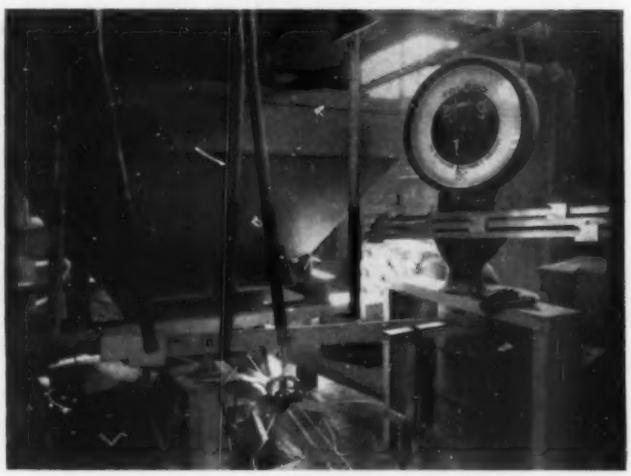
Mixer truck of Fred Schmitt Material Co., dumping load of concrete on the job

After the truck is spotted under the mixer discharge chute, the driver pushes a button which switches on a light in back of this truck's number on a glass plate on the operator's floor. He then clips his order slip to a piece of twine strung over pulleys and with a couple of pulls delivers his order slip to the operator.

The operator weighs out the exact proportions indicated on the slip, places the mix in the mixers, and keeps the slip as his record. He signals the truck driver by a buzzer when he is ready to empty the charge into the truck and the driver signals back when he is ready. As a check, the loaded truck is weighed before it leaves the yard. The open top mixers tilt toward each other and discharge through a common chute. By switching on a light the operator can look into the open top mixers to see that the mix has the proper consistency. The mixers are equipped with an improvised dust collector system to keep dust from rising to the operator's enclosed mixing floor.

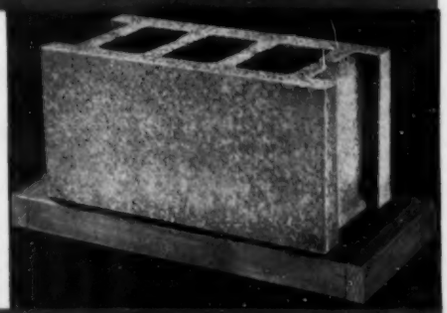
This plant has a daily capacity of 500-cu. yd. of concrete. An auxiliary batching plant was built in 1937 to accommodate the business overflow. This plant is a typical 100-ton, two-compartment Butler bin and weighing hopper. Aggregates are shipped in by rail and discharge to a track hopper and are carried to the boot of vertical bucket elevator, 60-ft. centers, by a 20-in. belt conveyor on 12-ft. centers. Aggregates are weighed on a Toledo scale and water is added from a 55-gal. drum fed by a pipe from the main plant. The truck mixers receive their cement direct from the adjacent warehouse. Aggregates in this plant also are heated by jets.





LEFT: Automatic water-measuring tanks for two mixers. Note switches and cord pulley for orders from drivers below. RIGHT: Weighing hopper for three aggregates and new three-beam scale

MAKE WHAT THE PRESENT BUILDING MARKET DEMANDS

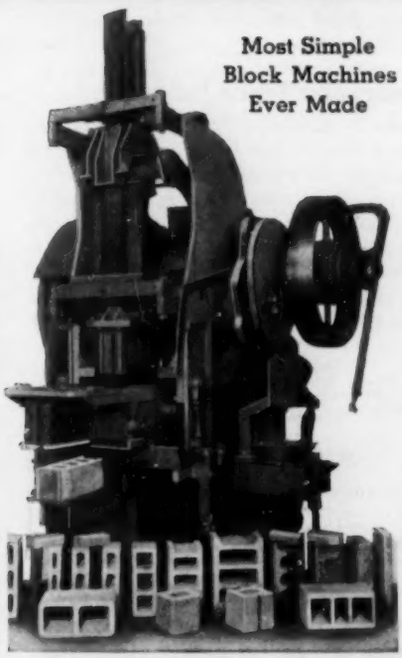


Concrete Masonry Is Taking the Lead

Concrete Masonry units are fast coming to be the leading building construction material—and improved quality is the reason. Concrete has always been recognized as firesafe, storm-safe, vermin-proof, solid and permanent, but not quite moisture resisting enough nor good enough in appearance and finish for exposed walls. Now the extra hard tamping given by Besser Plain Pallet Strippers makes moisture resisting, dampproof, blocks. The FULLY PRESSED TOP gives better appearance of edges and corners, completely filling the demand for quality that appeals to the eye in the finished walls. You can make them on Besser Plain Pallet Strippers. Architects and builders and home owners want them. They cost no more to make than the old fashioned rough units used to cost. Surely you are not going to pass up this opportunity to supply a ready market.

Quality That Appeals to the Eye

Most Simple Block Machines Ever Made

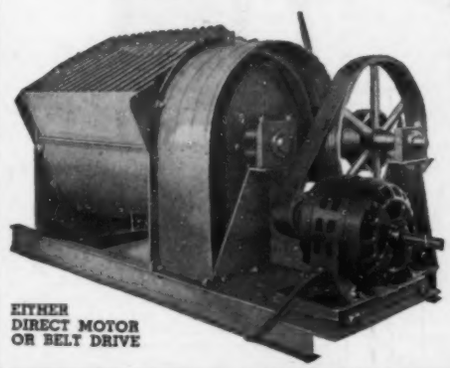


All Units Made on One Set of Plain Wood or Steel Pallets

BESSER BATCH MIXERS

In All the Standard Capacities

5, 12, 18, 25, 30, 40 and 50 Cubic Feet



EITHER DIRECT MOTOR OR BELT DRIVE

BESSER PLAIN PALLET STRIPPERS

The Saving in Pallets Pays for a Besser Plain Pallet Stripper

FULLY AUTOMATIC—3 Models—Capacities: 2000 to 4000 units per day.

SEMI-AUTOMATIC—4 Models—Capacities: 1000 to 2000 units per day.

POWER OPERATED with Hand Controls—2 Models—Capacities: 500 to 1000 units per day.

MULTI-MOLD—Hand Operated—Capacities: up to 300 units per day. For manhole blocks, brick slabs and small cored units.

AUTOMATIC BRICK MACHINES—Capacities from 10,000 to 50,000 units per day. For brick, slabs, coal cubes and other small units.

Besser Manufacturing Company are owners of all patents ever granted on concrete stripper block machines using plain pallets. These patents completely cover the basic Plain Pallet Stripper principle. No firm or individual is licensed or allowed to make machines under any of these patents.

BESSER MANUFACTURING CO.

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS

Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND

204 38TH STREET **ALPENA, MICHIGAN**

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

Expansion

HOUSTON CONCRETE PIPE CO., 115 Harvard St., Houston, Texas, is producing what is known as a self-centering concrete pipe, according to W. B. Dixon, president of the new company which began operations last December. Using new machinery and equipment, which includes a patented device to provide the self-centering bell ends of the pipe, the company produces and carries in stock concrete pipe from 4-in. to 12-in. size. The company also makes all sizes of concrete fittings for drainage and sewer projects. Other officers include: E. S. Dixon, secretary-treasurer, and M. L. Cross, plant superintendent.

Nebraska Truck Rates

The Nebraska Railway Commission recently established truck rates on sand and gravel used for commercial purposes in conformity with the new uniform motor carrier tariff. Rates are now 30 cents per ton on minimum loads of 12,000 lb. for distances less than 10 miles, the rates increasing with the distance up to a maximum of $1.20 per ton for 40-mile hauls. A slightly higher scale was set for Omaha. Prevailing rates for federal projects were continued, but the per mile charge on state projects was boosted from 3 to 3½c per cu. yd.

A Long Haul

LAUBHEIMER BLOCK CO., Nashville, Tenn., has an order to ship about 33,000 Tuff-Lite concrete building units for construction of an auditorium near Asheville, N. C. The units were shipped by rail a distance of 400 miles.

Cement Pictures

LONE STAR CEMENT CORP., New York, N. Y., recently displayed two moving pictures, "Better Cement Makes Better Concrete" and "Heavy Duty Floors" before the New York Building Congress, Inc. L. G. McConnell, vice-president of the cement company, answered technical questions.

Large Contract

CALIFORNIA PORTLAND CEMENT CO., Los Angeles, Calif., has been awarded two contracts totaling $394,000 by the Department of the Interior for the All-American canal.

Another Ready-Mix Plant

BIG ROCK STONE AND MATERIAL CO., Little Rock, Ark., has completed a modern steel and reinforced concrete plant which replaces the old structure. The plant has a capacity of 200 tons of crushed rock an hour. Construction of the new plant was necessitated due to the need for more efficient production of ready-mixed concrete.

Project

LEE C. SWARTZ, Grand Coulee, Wash., is reported seeking a location to establish a ready-mixed concrete and concrete products plant in some nearby locality.

· NEWS · OF · THE · MONTH ·

Rescind Gravel Law

SACRAMENTO, CALIF., recently passed an ordinance which would require that all sand and gravel used in cement construction work be washed and crushed in power driven machinery. Councilman William E. Truesdale, who sponsored the ordinance, stated the measure would assure a better type of concrete construction. The ordinance was rescinded by the sponsor, however, as a referendum petition had been filed with the city council which would have required the ordinance to be rescinded or submitted to a vote of the people.

Lease Quarry

RAY COOK, highway contractor, Navada, Iowa, has leased the limestone quarry south and west of Dayton's Park. In addition to construction and road-building requirements, the quarry will meet the demand for agricultural limestone. A large crusher and pulverizer has been installed together with necessary power equipment.

Fire

GRANITE ROCK CO., Hollister, Calif., suffered a fire loss when its office and adjoining property went up in flames, of unknown origin. Henry De Witt, caretaker, was severely burned.

Enlarge Plant

GENERAL CRUSHED STONE CO. is erecting a new steel and fireproof addition to the Tamiesite division of the Hazleton, Penn., plant.

New Quarry

E. W. YOUNG STONE CO., Augusta, Kans., has abandoned quarry operations south of Augusta and has opened a new limestone quarry on the Mattie Moser place, 1½ miles west and ½ mile south of Augusta. Eighty acres are under lease, carrying a 12-ft. deposit. Rock and crushing equipment have been approved by the State Highway Department.

Agstone Mill

CENTRAL ROCK CO., Lexington, Ky., is completing installation of a new agricultural limestone mill at its main plant. Rock will be hauled direct from the quarry to the mill in trucks. The primary breaker, a 9- x 36-in. Telsmith jaw crusher, will reduce the stone to 2½-in. and under. Throughs from this crusher will feed to a new Williams NF40 hammer mill over a 9-ft. conveyor feeder 36 in. in width. The finished product, 98 percent minus ⅛ in., will pass direct from the hammer mill over an 18-in. belt conveyor, 60 ft. centers, to loading bins.

Enterprise

HOLLINGERS GRAVEL CO. has purchased the gravel plant and equipment formerly owned by Earl Skinner and M. A. Teaford near Palestine, Ohio. The plant has been reconditioned and is now in operation. The New Madison, Ohio, plant also is in operation.

TRI-COUNTY SAND AND CONCRETE CO., Seminole, Okla., has enjoyed a rapid expansion in business. Organized by Pedro Simpkins on July 16, 1932, the company now has offices in Seminole, Fittstown and Stonewall with concrete batching plants in each of these cities and a rock crushing plant southwest of Fittstown. Fourteen ready-mixed concrete trucks and six trucks with hydraulic dump bodies are now operated. The company deals in sand, gravel, crushed stone, concrete, and building blocks.

SMOOT SAND & GRAVEL CORP., Washington, D. C., will construct three one-story steel cement storage tanks in the rear of 3020 K St., NW., at an estimated cost of $15,000.

BREMERTON SAND AND GRAVEL CO., Bremerton, Wash., is now in operation about a quarter of a mile from Kitsap Lake. According to W. A. Parker, of the Parker Lumber Co., and co-partner in the new $15,000 enterprise, the plant has 60 acres of land to work with a supply for 50 years' operation. A modern sand and gravel plant has been erected, capable of producing the finest plaster sand up to 3-in. gravel for paving.

SOUTHERN BUILDERS SUPPLY CO., INC., Louisville, Ky., has purchased four transit-mix trucks and is entering the ready-mixed concrete business. At present, aggregates are batched into the truck mixers direct from the bins of commercial aggregate producers.

Limestone Quarry

A CRUSHING PLANT, sponsored by the Junior Chamber of Commerce of Okolona, Miss., started operation 1½ miles west of the city. F. T. Harris and J. T. Jolly are operating the quarry.

Gravel Pit Suit

QUEEN ANNE SAND & GRAVEL CO., Seattle, Wash., has been fighting for the right to operate its property at Third Avenue West and W. Fulton St., which has been under fire by the City Council of Seattle, and which has been seeking to have the courts hold the gravel pit to be a public nuisance, alleging that it is a hazard to school children in the district. The corporation counsel held that the city cannot spend public funds to fill the pit or can it abate the pit as a public nuisance because the children would be trespassers on the property. The city is now seeking to have the pit declared a private nuisance, and is endeavoring to have private property owners in the vicinity, or the Seattle School district, which controls the North Queen Anne School, to take action.

Dissolution

MARSHALLTOWN SAND AND MATERIAL CO., Marshalltown, Iowa, has announced through President E. A. Howard that the corporation, organized under Iowa laws, will be dissolved and the assets will be taken over by the Le Grand Limestone Co.

Improvement

MONOLITH PORTLAND MIDWEST CO., Laramie, Wyo., has installed new air separator equipment in its finish mill. The report states that the $50,000 installation will speed up production about 30 percent.

New Cement Plant

GULF PORTLAND CEMENT CO., Houston, Tex., is now in production in the new plant which has a productive capacity of 850 bbl. per day. The Gulf plant was the only new plant built in 1937, and is said to embody in its design and equipment many departures from older methods.

Open Old Quarry

AN OLD QUARRY in Jefferson county near Fairbury, Neb., has been reopened and crushing equipment has been installed for the production of stone for paving. The county is operating the quarry as an unemployment relief project. Before the Civil War, the old quarry furnished limestone for the production of lime. The old kiln tower may still be seen.

Kentucky Buys Agstone

THE COLLEGE OF AGRICULTURE at Lexington, Ky., reports that in 1937 farmers used 819,432 tons of ground limestone, lime, and marl for application on the land. This large quantity was purchased by 34,296 farmers, and included 734,000 tons of ground limestone, 75,000 tons of marl, and 9000 tons of lime. Hardin county led the list with 42,000 tons of lime, followed by Christian, Bourbon, and Logan counties. This was the second year that more than 800,000 tons were used.

Sand and Gravel Tax

OKLAHOMA proposes to place a so-called severance tax on a number of commodities for the purpose of obtaining funds for the payment of a $50 minimum monthly pension. Sand and gravel, stone and other mineral products would have to pay a tax of 10c a ton under the proposed law. At present, the pension rolls of some 69,000 require a monthly budget of a million dollars. If the present rate of about $15 per pension is increased to 3½ times this amount, the annual pension budget will be around $40,000,000.

To Recover Stone Dust

BLANTON STONE CO., INC., Frankfort, Ky., is reconditioning its plant and installing a dust collector before beginning the season's operation. Dust collected from the vibrating screens, elevators and around the crushers will be recovered in bins, to be sold as a neutralizing substance for stock foods.

Utility Crusher

LOUISVILLE CRUSHED STONE CO., Louisville, Ky., has increased the flexibility of its plant by addition of a 2-ft. 4-in. TY Traylor reduction crusher. Stone for which there is no demand is reduced to chip sizes through this crusher.

Building Stone Plant

RALPH ROGERS CONSTRUCTION CO., Bloomington, Ky., is reported to be building a new stone crushing plant near Corydon, Ind. The new plant will be completed about April 1.

Modernizing

CALDWELL STONE CO., Danville, Ky., is installing an 18- x 36-in. Traylor jaw crusher to replace two other primary crushers.

KENTUCKY STONE CO., INC., Louisville, Ky., is reported to be constructing a new stone crushing plant at Tyrone, Ky.

Resume Operation

UNIVERSAL ATLAS CEMENT CO. has resumed operation at the Hannibal, Mo., plant, according to recent reports. It is said that the plant will resume on the average production basis of 1937. About 350 men are employed at this plant, which has been shut down since December for relining of kilns and other repair work. The Hudson, N. Y., plant started operations on March 15.

THE PORTLAND-BEAVER CEMENT CO. plant at Gold Hill, Ore., started up operations about March 1, states a newspaper report.

GREAT LAKES PORTLAND CEMENT CO. and the Federal Portland Cement Co., Buffalo, N. Y., have resumed operations after a seasonal shut-down. The Great Lakes plant went into production with two kilns and the Federal lighted one kiln.

LONE STAR CEMENT CORP., started up operations at the Bonner Springs, Kan., plant on March 1, with two kilns.

ASH GROVE LIME AND PORTLAND CEMENT CO. planned to reopen its Louisville, Neb., plant early in April after the annual 30-day overhaul period.

Blast Suit

TOWER GROVE QUARRY & CONSTRUCTION CO., St. Louis, Mo., is fighting a suit to enjoin the company from operating in such manner as to "rock tremble and vibrate" the home of Mr. and Mrs. Charles E. Boersig, who instituted suit. Quarry officials denied any responsibility for the damage, claimed to be $500, in an answer to the suit.

Political "Pressure"

THE AMERICAN STONE CORP., Lima, Ohio, through Willis R. France, president, has charged that the Ohio highway department had applied "pressure" on his company due to his policy of governing the selling cost by the cost of production. This "pressure", he claims, is applied by requiring unreasonable rate of delivery, questionable sampling of material for tests and slow payment of accounts.

Phosphate Plant

CONSTRUCTION of a low-cost phosphate fertilizer plant for states west of the Mississippi river is proposed in legislation now being drawn up by Senator James P. Pope of Idaho. Dr. H. A. Morgan, a director of the TVA, is assisting the senator in promotion of the plant which is designed to produce 235 tons of concentrated super phosphates daily from the vast southeastern Idaho rock phosphate bed estimated to contain 6,500,000,000 tons. The Wyoming Soda Products Co., Green River, Wyo., has offered the facilities of its chemical laboratories in establishing an experimental phosphate-potash plant.

Agricultural Stone

HOPKINSVILLE STONE CO., Hopkinsville, Ky., is now operating a 30- x 36-in. Jeffrey hammer mill for the production of agricultural stone. The mill is driven by a 75-hp. motor through a flexible coupling and has an average hourly output of 15 tons of minus 10-mesh product. Chip sizes or larger stone are fed direct to the mill through chutes from overhead bins.

TRENDS

as Evidenced by Purchases

R & L CONCRETE MACHINERY CO., Kendallville, Ind., recently installed a concrete joist machine for L. A. Warren and Co., Nashville, Tenn.

• • •

BRADLEY PULVERIZER CO., Allentown, Penn., reports the installation of 11 Giant Griffin mills in a Lehigh Valley portland cement plant. Announcement also has been made that sales of the new Junior Hercules mills have been consumated with the following companies: A. J. Snyder, Rosendale, N. Y.; New Castle Lime & Stone Co., Hillsville, Penn.; National Lime & Stone Co., Spore and Carey, Ohio; and Ohio Blue Limestone Co. A description of the new mill will appear in a later issue.

• • •

ROBINS CONVEYING BELT CO., New York City, has installed the following new equipment: National Lime & Stone Co., Bucyrus, Ohio, one double-deck 48- x 102-in. Gyrex screen, two double-deck 48- x 102-in. Vibrex screens, and one belt and bucket elevator; New York Trap Rock Co., Haverstraw, N. Y., four single-deck 48- x 120-in. Vibrex screens; Halton Amiesite Co., Mt. Vernon, N. Y., one double-deck 60- x 120-in. Gyrex screen, an extension to existing conveyor, and movable hopper for bagging amiesite; A & B Street Oil & Tar Co., Springfield, Ohio, one double-deck 48- x 120-in. Vibrex screen; Great Eastern Gravel Corp., Port Jefferson, N. Y., two triple-deck 60- x 192-in. Gyrex screens; A. L. Blades, Hornell, N. Y., one double-deck 48- x 120-in. Vibrex screen; C. C. Beam, Milvin, Ohio, one double-deck 48- x 120-in. Vibrex screen.

• • •

BABCOCK & WILCOX CO., New York City, reports the sale of four direct-firing coal mills to the Giant Portland Cement Co.; three to the Alpha Portland Cement Co., La Salle, Ill., mill; two to the Universal Atlas Cement Co., for its Leeds, Ala., mill, and five to another company's mill in the La Salle, Ill., district. More than 100 direct-firing units have been sold to the rock products industry to date.

Freight Rates

(Continued from page 64)

without affording us an opportunity for a public hearing. In the instant proceeding (Ex Parte No. 123), the carriers were granted a 10 percent non-cumulative increase in all rates on sand and gravel, crushed stone, and slag. Based upon the foregoing, we find that a rate of 50c in effect on December 19 last now becomes 55c; a rate of 70c on December 19, having been increased to 75c on December 20, now becomes 77c; and a rate of $1.10 in effect on December 19 last, having been increased 10c on December 20, now becomes $1.21. In other words, the authorized increase of 10 percent in rates applies to the rate in effect prior to the increase authorized in Ex Parte No. 115, and not to the rate arrived at as a result of the increases which became effective on December 20. To that extent, it is clear that Ex Parte No. 123 amounts to a reconsideration by the Commission of its action in Ex Parte No. 115, and as to most of our rates, the action in Ex Parte No. 123 merely sets aside the findings in Ex Parte No. 115, and substitutes for the graduated increase in rates there authorized a percentage method of increasing rates.

"In setting forth its conclusions, the Commission stated that the application of the 10 percent increase would be subject to application of the rule of fractions. Perhaps here again it would be useful if we selected specific figures in explaining the effect of this holding. A rate of 61c in effect on December 19 became 66c on December 20. In Ex Parte No. 123 the carriers were allowed by the Commission to increase the 61c rate by 10 percent, or an increase of 6.1c. Under the rule for disposition of fractions, the new rate will be 67c. On the other side of the application of the rule for disposition of fractions, a rate of 68c in effect on December 19 may now be increased 10 percent, or 6.8c. That rate will become 75c. The same factor can be applied by member companies in determining the effect of the increase on all of their rates, irrespective of its level."

Cement Statistics

PORTLAND CEMENT INDUSTRY in February, produced 3,916,000 bbl., shipped 4,575,000, and had in stock at the end of the month 24,364,000, according to the Bureau of Mines. Production and shipments in February showed decreases of 32.9 and 11.4 percent, respectively, as compared with February, 1937. Stocks at mills were 2.8 percent lower than a year ago.

The statistics here given are compiled from reports for February received by the Bureau of Mines, from all manufacturing plants.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 160 plants at the close of February, 1937 and 1938.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	February 1937	February 1938	Jan. 1938	Dec. 1937	Nov. 1937
The month	29.6	19.8	20.7	32.2	43.7
The 12 months ended	45.8	43.7	44.5	45.3	46.0

Obituaries

FRED L. WEAR, production and sales manager of the Olympia Sand Co., San Jose, Calif., a division of the Pacific Coast Aggregates Co., died February 25. He was only 44 years old. Mr. Wear was also vice-president of the Santa Clara Valley Sand and Gravel Producers' Association. Before coming to San Jose, he was engaged in the general hauling and trucking business in Pomona, Calif.

●

WALKER W. SMITH, credit manager of the Stewart Sand and Material Co., Kansas City, Mo., died suddenly of a heart ailment on March 1. Mr. Smith, who was 58 years old at the time of his death, was widely known in the sand and gravel industry.

●

MAURICE ALVIN LONG, vice-president of Maryland Slag Co., and head of the nationally-known firm of engineers and contractors, M. A. Long Co., Baltimore, Md., died February 27 at the age of 62. At the time of his death, Mr. Long was chairman of the board of directors of the Western Maryland Railway Co., and also a director of several banks and insurance companies. He was at one time architect and assistant chief engineer of the Baltimore & Ohio Railroad. Mr. Long was a member of the American Society of Civil Engineers, the American Railway Engineering Association, The Pennsylvania Society of Professional Engineers, The Maryland Academy of Sciences, and was past president of the Maryland Chapter of the Associated General Contractors of America.

●

MARK A. CALLAHAN, founder and president of M. A. Callahan Co., Cleveland, Ohio, recently died at the age of 79. He was a sand and gravel operator.

Improvements

LONE STAR CEMENT CORP., Kansas division, Bonner Springs, Kan., recently completed installation of air separation equipment in its clinker grinding department. The installation was made without interruption of grinding operations save for about one week required to make the necessary connections to the mills.

New MACHINERY & EQUIPMENT

Vibrating Concrete In Place

SYNTRON Co., Homer City, Penn., has placed on the market a new electric motor-driven, internal type of concrete vibrator for vibrating concrete into

Portable concrete vibrator for vibrating mass concrete

place during the pouring operation. The machine has portability and consists of an electric motor mounted on wheels, a variable length of flexible shafting, and the vibrating tool which is immersed in the concrete. A machine of this type has application wherever any appreciable mass of concrete is being placed. The repulsion-induction type motor operates on 110 or 220 volts single phase, alternating current. The flexible shafts are metal armored, and are available in 7-ft. and 12-ft. lengths that can be coupled to extend its operating range.

Portable Skip Transfer Plant

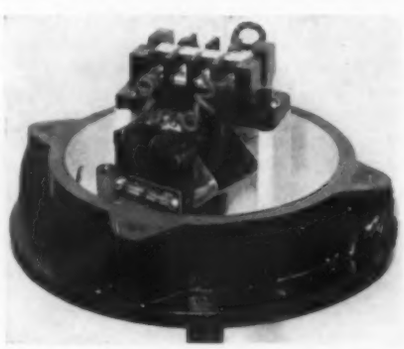
INSLEY MFG. CORP., Indianapolis, Ind., has designed a portable skip transfer plant to be set up on the job for charging truck mixers. The proportioned aggregates are hauled from the nearest gravel pit or siding and dumped into the skip with the cement placed on top. The batch is hauled up the ramp and discharged into the truck-mixer. Water is supplied through a control meter.

A regulation wrecking truck may be used to set up, dismantle and tow the plant from job to job. This same truck can carry a hoisting drum and a power-take-off for operating the skip. The skip is held in position and lowered by means of an automatic brake.

There is said to be a distinct advantage to the concrete producer in hauling the proportioned aggregates direct from the source of supply to the job; in the saving of the cost of re-handling through a central mixing plant; and in the reduction of the number of mixing trucks required to service the job. An advantage to the contractor is the ready synchronizing of the supply of concrete with the needs of the job.

Material-Level Indicator

FULLER Co., Catasauqua, Penn., has developed a material-level indicator for use in controlling conveyor motors, valve circuits, etc., or to give audible or visible warnings when the material reaches or falls below a predetermined level in a bin. The indicator is positive in operation, and it is said that it will not make a false indication either in the event of a momentary surge of material in the bin or indicate a low level when an aerated pulverized material settles. The same indicator can open or close one or more circuits, such as signal, motor control, valve control or similar equipment. Switches may be actuated instantly when the material level reaches the indicator or may, by adjustment, be delayed for any interval up to 10 seconds.



Bin level indicator and control for conveyor motors

Principal working parts of the apparatus are totally enclosed in a dust-tight casing which rests upon the bin cover, a paddle being suspended in the bin at the desired level. The paddle supporting shaft is driven continuously at 1 r.p.m. by a Telechron motor which is so supported as to turn about the axis of the paddle shaft. When the level of material reaches and arrests rotation of the paddle, the motor is driven about the axis of the shaft and actuates the switch mechanism.

Improved Hoists and Dump Bodies

GAR WOOD INDUSTRIES, INC., Detroit, Mich., has announced the introduction of a complete, new and re-designed line of hoists and dump bodies for 1½- and 2-ton truck chassis—both short and long wheelbase—together with an improved line of heavy-duty dump-bodies, hydraulic hoists and mechanical hoists.

Direct-lift hoist, Model D6, which has been improved by increasing the dumping angle and lowering the mounting height

The units present many new improvements, and feature greater strength, reduced weight, lower mounting height, greater dumping angle and a fine appearance in keeping with the trend of modern chassis design. Box-type tailgate construction and stronger, yet lighter body trunnion distinguish the new C line of dump bodies. Models D6, D7, and D7L direct-lift, hydraulic hoists have been completely re-designed, using steel forgings and lighter but stronger stampings.

Magnetic Reversing Switches

GENERAL ELECTRIC Co., Schenectady, N. Y., has brought out a line of combination, reversing, magnetic switches which employ air circuit breakers. These devices were designed as alternative equipment for fused motor-circuit switches, and feature low installation cost, space economy, and increased safety. The combination, reversing switches are primarily intended for the full-voltage starting of a-c motors.

The equipment is said to be particularly suitable for use where short-circuit protection for individual motors is desirable and as a means of discon-

necting the power-supply line to switch and motor. The complete device consists of an air circuit breaker, two magnetic contactors mechanically interlocked, and a temperature overload relay, all enclosed in a sheet-metal case for wall mounting.

Reversible Ratchet Handle

BONNEY FORGE & TOOL WORKS, Allentown, Penn., has brought out a new reversible ratchet handle for ⅜-in. square drive sockets and attachments, to be known as No. T35.

It is said to be light in weight, strong and perfectly balanced. In order to keep

Reversible ratchet handle having lugs for ⅜-in and ¼-in. drive sockets

out all dust, dirt, grit and grease, the ratchet has been fully enclosed.

The ⅜-in. lug makes it adaptable for use with all ⅜-in. square drive sockets and attachments. On the other side of the head is a ¼-in. square opening for use with ¼-in. adaptors or for use on small compressors, motors, shut-off valves, etc.

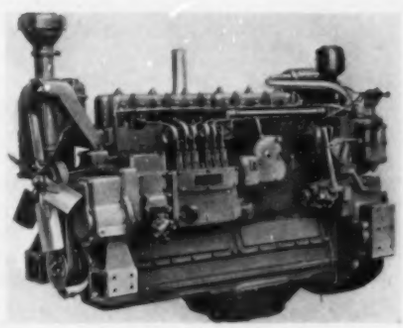
Made of chrome-vanadium steel, chromium plated and highly polished, it has a round knurled handle which insures a firm, comfortable grip. It will be a useful addition to the kit of any mechanic who uses ⅜-in. square drive sockets.

Blade Mill for Washing Limestone

ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis., reports that the blade mill, a special development, has been finding many applications in the washing, disintegrating, and cleaning of ores and other materials containing a large amount of clay, slimes or other impurities, that are detrimental to subsequent processes of treatment. In the illustration is shown a blade mill, 7 ft. in diameter and 18 ft. long, under construction at the West Allis Works of the company, designed for a large limestone company in West Virginia. It will wash tenacious clay from crushed limestone that will be used as a flux in blast furnaces. The mill will be driven by a 75 hp. motor. Approximate weight of this blade mill is 67,000 lb.

Diesel Engine For Shovels and Hoists

CATERPILLAR TRACTOR CO., Peoria, Ill., has announced a six-cylinder, 66-hp. model, designated as the D4600. The engine has a bore and stroke of



Diesel engine for use in shovels, draglines and hoists

4¼- x 5½-in. and turns at 1400 r.p.m. normal governed speed. This model is said to be well suited for use in shovels, draglines and hoists, or connected to a generator as an electric power producer. The engine is of the four-stroke-cycle, valve-in-head, water-cooled design, and features solid injection of the fuel into pre-combustion chambers. A 14-hp. gasoline starting engine is mounted at the rear of the Diesel.

In construction work, the engine will power ¾-cu. yd. shovels and draglines. As a source of electric current, it will be offered as a unit with a 35 kw. generator at 50 cycles at 1500 r.p.m.; or as a 32½ kw. generator at 60 cycles at 1200 rpm.

Control for Material Handling Cars

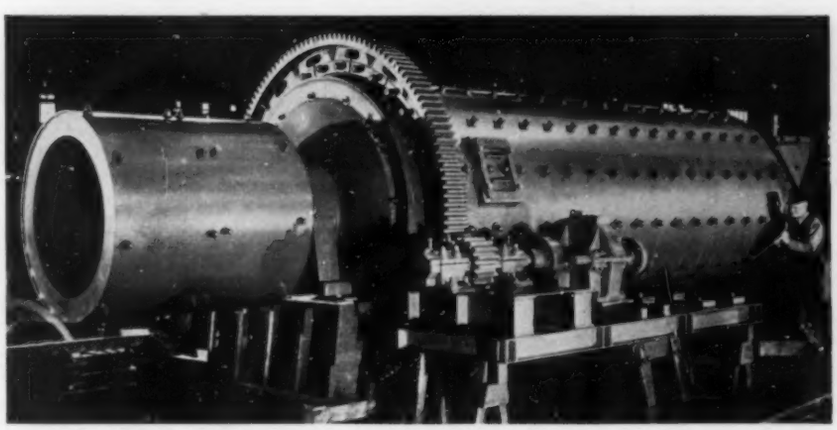
WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Penn., has announced a control development for transfer cars, scale cars and all locomotive type materials handling cars, which provides automatic "step by step" acceleration with current limit "plugging". The control is accomplished by a simple single handle master controller, which may be operated, on either side of the "off" position, corresponding to the direction of motion desired. This master controller operates switches, which are in turn controlled by a limit relay. Advantages claimed for this control are: acceleration rate depends upon weight of load; motors are relieved of excessive strains; and operation of car is flexible since it can be accelerated and stopped or reversed by operation of the master controller.

Oil-Proof Conveyor Belt

THE MANHATTAN RUBBER MFG., Division, Raybestos-Manhattan, Inc., Passaic, N. J., is now manufacturing an oil-proof conveyor belt to meet the demand for a belt that is impervious to oil. Known as Paranite-G. O. P., the conveyor belting was originally designed for use as a take-off belt in brick plants, where kerosene is dropped on cutting wires directly over the belt.

Quite often coal or coke is carried by an incline belt conveyor up to a hopper over distributing trucks. At the head end of this conveyor a thin oil in a spray or vapor is applied, covering each particle of material and allaying dust. Rubber conveyor belting quickly becomes soaked with oil, causing swelling, softening and early destruction of the rubber.

BLASTERS' HANDBOOK is a 281-page book of handy pocket size which has been prepared by E. I. Du Pont De Nemours & Co., Wilmington, Del., under the direction of Arthur La Motte, manager of the Technical Section. This is the ninth edition of the handbook which is widely known and used in the rock products industry. It describes practical methods of using explosives for various purposes, and contains valuable reference tables and many illustrations of blasting practices.



Blade mill which is being used for washing, disintegrating, and cleaning ores and rock products which contain a large amount of clay and other deleterious materials

Modern Service Standards For

MAGNESITE LININGS IN KILNS

By W. F. ROCHOW*

REFRACTORY LININGS IN ROTARY CEMENT KILNS are subject to so many operating variables that predictions based on theory or analogy regarding their life in service are likely to be wide of the mark. Results achieved from a given refractory material at any one plant under the conditions there prevailing are generally an insufficient basis for definite conclusions as to the probable behavior of the same material in another plant where operating conditions are different.

While it is primarily a question of comparative kiln lining costs per barrel of production, the economic balance is not a simple one. It may depend to a large degree upon the desirability of securing a greater output of cement per day from the same plant investment by stepping up the operating rates of the kilns above their rated capacities. In one cement plant, for example, this trend has now reached a point where kilns previously rated at 900 bbl. output in 24 hours are regularly producing more than 1600 bbls. per day. Moreover, since the life of the linings is shortened by this severe service, labor costs in relining become a more significant factor, and production losses while the kiln is out for relining become proportionately greater.

Another complicating factor is the trend toward the use of cement mixes requiring more severe burning conditions. The higher lime cements which form an increasing proportion of recent production, gain their desirable characteristics under burning conditions entirely beyond the limits which permit the use of the high heat duty fireclay brick of the 40 percent alumina class that were generally used for burning zone linings ten or fifteen years ago.

High Burning Temperatures Affect Life of Linings

Within the past ten years, pioneers in these trends toward "overload" operating rates, higher lime cement mixes and increased burning temperatures, have set a course, step by step, for the construction of burning zone linings with brick of types extending through the entire range of alumina-silica refractories. Lining blocks of the 40 percent alumina class gave way to those of 50 percent, 60 percent and finally 70 percent alumina, and in each case, the pioneering step was soon considered standard modern practice.

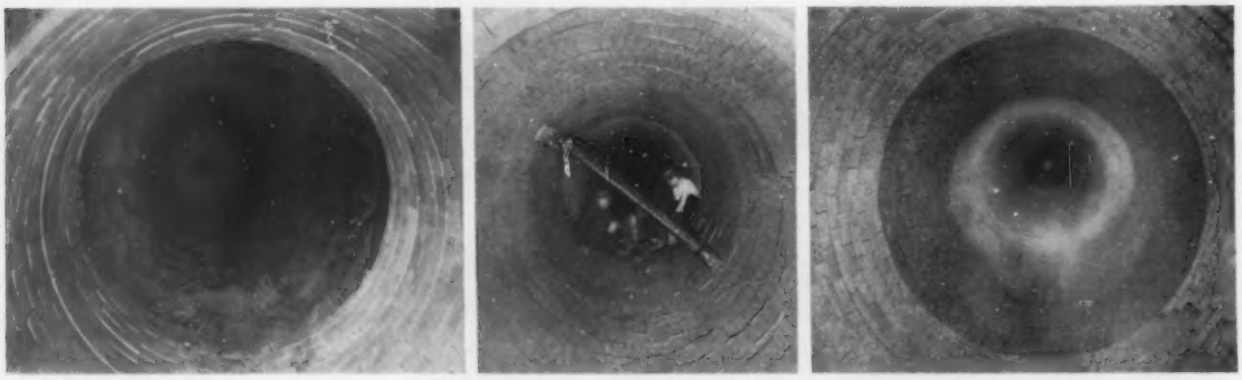
Today, at a number of plants, the burning conditions and operating rates have reached a point at which the life of kiln linings of even the best 70 percent alumina brick is reduced to a period of two or three months, or even less. As far as alumina refractories are concerned, this was recognized as the limiting point. In other words, the overall economic balance required either that (1) burning conditions be held below this level of severity or (2) a kiln lining of definitely superior refractory qualities be adopted. To satisfy the latter, alternative initial trials with complete burning zone linings of fired magnesite brick were made as early as 1929 by one large cement company, and still earlier in two plants burning dolomite for refractory purposes. The installations justified themselves convincingly under the special conditions which prevailed, although this type of refractory should be confined in its general application to certain definite conditions.

With the development of chemically-bonded magnesite brick having high resistance to spalling and of lower cost than fired magnesite brick, the use of a basic lining of this type has become practicable under a wider range of operating conditions.

Normally, where burning zone linings of 70 percent alumina brick cost approximately $40 per foot, linings of chemically-bonded magnesite of an improved type may cost about $100 per foot. However, in almost every installation for which records are available, the additional operating life of the basic lining has overbalanced this differential —the advantage being most marked where operating conditions are most severe.

In one 10-ft. by 180-ft. kiln, for instance, the extremely severe operating

*Mr. W. F. Rochow, the author of the article, has made some interesting studies of refractory linings in rotary kilns in his connection with the Harbison-Walker Refractories Co., Pittsburgh, Penn.



Left: Interior of rotary kiln after relining of discharge end. This kiln was lined with chemically bonded magnesite brick in the burning zone and 70 percent alumina brick in the discharge end. Center: Jacks provide a convenient means of holding the brick in place until the rings are keyed. Right: A 30-ft. section in the burning zone lined with chemically bonded magnesite brick. In the adjacent section 70 percent alumina brick were used, and in the feed end, abrasion-resisting fire-clay brick

conditions—a highly refractory clinker and unusually high temperatures in the burning zone—reduced the life of a lining of 70 percent alumina refractories, to approximately three months' service. A 20-ft. section of the burning zone was lined with chemically-bonded magnesite brick and has now been in service well over a year. At a number of other plants, chemically-bonded magnesite brick in the burning zones have been in service more than a year; this period represents two to three times the life formerly obtained with 70 percent alumina brick.

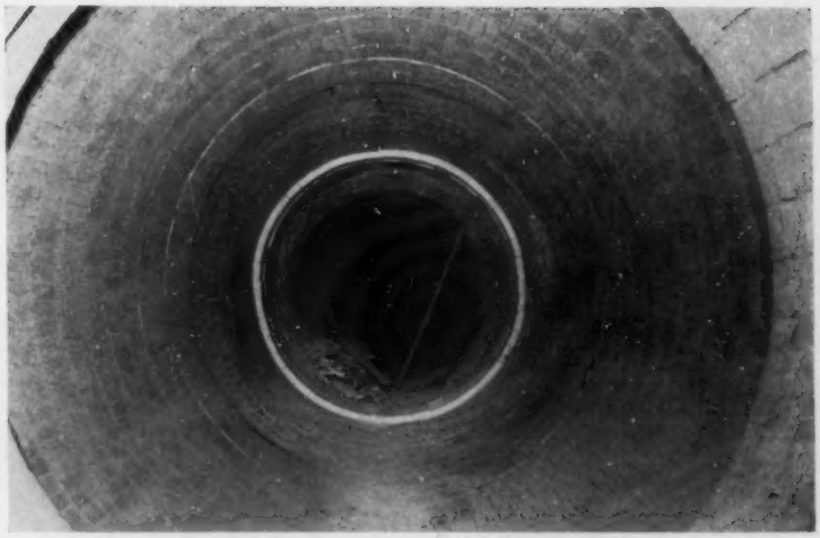
The magnesite brick which have proved to be best suited for these applications are arch brick 6- x 9-in. by approximately 3½-in. at the larger end. The bricks are laid with steel sheets between the longitudinal radial joints—a practice based upon the same principle as that followed in the utilization of metal-encased magnesite brick which have been widely used in metallurgical practice for many years. At the operating temperatures of the kiln, the exposed ends of the sheet steel oxidize and fuse; the fused material then penetrates the adjacent magnesite, and forms a face which is substantially monolithic. However, a short distance back from the face of the lining, the steel remains intact, and increases the strength of the lining as well as its resistance to temperature changes.

Dolomite Kiln Test Proves Value of New Brick

In every instance, the basic brick have taken on a firmly adhering coating, although as a result of the dense character of the brick, the penetration of softened clinker into the lining is considerably less than is the case with high alumina brick. Used in dolomite kilns operating at temperatures as high as 3100 deg. F., these bricks prove highly resistant to the fluxing action.

Originally, some doubt naturally existed concerning the ability of any magnesite brick to sustain the pressures imposed upon them in the kiln lining, and to resist the spalling influence of temperature changes resulting from interruptions in operation. However, in a number of the kilns now in service, where conditions not related to the kiln linings caused a succession of shutdowns which would have taxed the resistance of high alumina brick, no appreciable spalling occurred. Chemically-bonded magnesite brick of the type under consideration, have been gradually improved both in refractoriness and in mechanical properties as a result of experience with them in service during recent years.

In the cement industry there are definite limitations to the temperature



A 16-ft. section of chemically bonded magnesite liners in an 11-ft. diameter rotary cement kiln. Brick are laid with steel sheets in joints parallel to the axis of kiln, and expansion allowance is provided by inserting cardboard strips between the rings

of burning, and therefore to the fluxing tendency of the clinker, fixed by the chemical composition of the cement mix itself. However, rotary kilns for burning refractory dolomite are regularly operating in excess of those limits. In this service, the operating temperatures may be as high as 3100 deg. F., and fluxes (i.e., basic oxides) added with the charge are the cause of chemical attack of unusual severity on standard types of kiln lining. Previously, life of the refractories in the burning zones of these kilns has been measured in terms of weeks, or even days—rather than months. In one sense, the operation may be considered an "accelerated breakdown" test of refractory linings for the burning zones of rotary kilns, generally.

At this plant the service obtained from 70 percent alumina liners seldom exceeded 30 days before partial replacement of the lining was necessary. Accordingly, the total production seldom exceeded 5800 tons without the need for extensive lining repairs.

Late in 1936, a lining was installed with a 30-ft. section of Magnex brick at the center of the burning zone. After 90 days of operation with a production of about 18,000 tons of refractory dolomite, the furnace was shut down for relining. The weakest point, however, was found to be not in the magnesite section, but rather in the adjoining section at the end of the burning zone. This section had been lined with 70 percent alumina brick because the temperature conditions there were less severe than in the other section. The kiln went back into service, with an additional 22 ft. of this basic lining.

Another notable example of the resistance of magnesite to unusual severity of service has been established in lime recovery kilns used for calcining lime sludge. Not only are the temperature conditions severe, but the lime sludge carries free alkali which is particularly destructive to the ordinary type of refractory lining.

The outstanding service given by magnesite brick under conditions of extreme severity, should not be considered as an indication that 70 percent alumina linings in rotary kilns are definitely doomed to replacement. This would be an unfortunate, and an unwarranted conclusion. As was mentioned at the beginning of this article, operating variables are so numerous that accurate generalizations are not always possible. Among these variables are the following twelve, from a list that totals almost twice that number: 1. Composition of the clinker; 2. Refractories of the clinker; 3. Fineness of grind; 4. Alkali content of clinker 5. Variation in composition or rate of feed; 6. Tendency toward ring formation; 7. Regularity of operation; 8. Type of fuel; 9. Length of burning zone; 10. Burner adjustment and direction; 11. Condition of the shell; and 12. Care used in bricklaying.

In view of these variables, the choice of refractory materials for the lining of a rotary kiln should be made from the entire range of refractory materials now available—fireclay brick, high alumina brick, chemically-bonded magnesite brick, and magnesite brick bonded by firing. Because this range is wider than ever before in first cost, in service life and in suitability to specific operating practices, the wisest choice necessarily requires greater care—and yields greater rewards.

THE INDUSTRY

New Incorporations

Perminite Corp., 33 N. La Salle St., Chicago, Ill., has been incorporated to mine, buy and sell gravel, soil clay and rock matter, with 1000 shares par value common stock; by R. C. Hash, M. Barnes and L. C. Duncan, who is the correspondent for the company and is located at 826 S. Wabash Ave., Chicago, Ill.

La Porte Cement Products Corp., R. R. 1, La Porte, Ind., has been incorporated to manufacture building material and cement products with a capital stock of 300 shares of no par value. Incorporators are E. B. Watson, Lloyd V. Cumerford and Sherman Cumerford, who is also resident agent and lives at 447 Pine Lake Ave., La Porte.

Montana Phosphate Products Co., Seattle, Wash., has filed a Trail, B. C. Amendment increasing capital to $110,000. The capital was formerly $50,000.

East Woonsocket Trap Rock Co., Inc., Woonsocket, R. I., will engage in the sand, gravel and crushed stone business, according to the charter of the company. The company will issue 500 shares of common stock no par value. The incorporators are Frederick Pelletier, Harriet A. Creech, both of Woonsocket and Sidney Silverstein of Providence.

The Richland Dunbrik Co., Inc., of Columbia, S. C., was granted a charter to deal in brick, tile, pipes, and pottery, and has as officers J. Coker Anderson, president and treasurer; Mildred Clayton, vice president and secretary. The concern is capitalized at $7000.

N. Y. & N. J. Sand & Stone Co., Inc., New York, N. Y., incorporated with 100 shares of no par value stock to deal in sand, stone, concrete and paving material. Resident Agent is Jos. S. Meadow, 225 Broadway, New York City.

Manufacturers

The Ray-Ewbank Machinery Co., 101 Chandler St., Montgomery, Ala., has been designated as distributor for county sales in the southern half of the state of Alabama by Bucyrus-Erie Co., South Milwaukee, Wis.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., has appointed C. A. Powel to be manager of the new Industry Engineering department. Previous to his recent appointment, Mr. Powel was manager of the Central Station Engineering department. J. S. Parry, Jr., has been named manager of the Mining Section, Industrial department, according to C. B. Stainback, manager. J. K. B. Hare has been appointed central district manager with headquarters in Pittsburgh.

J. S. Parry, Jr.

Sprout, Waldron & Co., Muncy, Penn., reports the appointment of Morgan L. Woodruff, 1812 Colfax St., Evanston, Ill., as district sales engineer for the Chicago area. Mr. Woodruff will cover parts of Wisconsin, Illinois, Iowa, Michigan and Indiana. W. S. Otto has been appointed district sales engineer for the St. Louis, Mo., territory. The Pittsburgh Gage and Supply Co. will act as distributors of power transmission equipment in the Pittsburgh area.

Taylor-Wharton Iron and Steel Co., High Bridge, N. J., has engaged R. A. Gezelius as metallurgist. Mr. Gezelius was formerly associate metallurgist of the Naval Research Laboratory, Washington, D. C., and is well known for his research work in physical metallurgy.

Burrell Engineering & Construction Co., Chicago, Ill., has announced the return of M. E. Crosby as chief engineer of the company. Mr. Crosby has been identified for a number of years with the design and construction of material processing, handling and storage plants for all types of nonmetallic bulk materials.

R. G. Le Tourneau, Inc., Peoria, Ill., and Stockton, Calif., has made a number of changes in official personnel as part of the recent sales management reorganization program. J. W. Le Tourneau, general sales manager since the founding of the company, has become general manager to permit his supervision and guidance over a much wider range of activity. Denn M. Burgess, formerly eastern sales manager, has become domestic sales manager. Assisting Mr. Burgess are John R. Bryan, acting western sales manager; Louis D. Le Tourneau, central sales manager; and Gordon S. McKenty, eastern sales manager. Jack Le Tourneau has become district representative in the Pacific Northwest. Howard Stilley is the new district representative in the North Central states, and Stanley D. Means continues as federal sales manager.

D. M. Burgess

Cutler-Hammer Co., Milwaukee, Wis., has announced that it has moved its Cincinnati, Ohio, office to the American Bldg., Central Parkway and Walnut streets.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., has announced the election of George H. Bucher as president of the company. Mr. Bucher was formerly executive vice-president of the company. Frank A. Merrick has been elected vice-chairman. Paul Judson Myler, president of the Canadian Westinghouse Co., became a director of the Westinghouse Electric & Manufacturing Co., at the same board of directors' meeting which elected Mr. Merrick and Mr. Bucher to their new offices.

The American Welding Society, New York, N. Y., has appointed a board of awards, composed of H. L. Whittemore, chairman, and G. T. Horton and A. G. Oehler to select the recipient of the Lincoln Gold Medal for 1938. It is to be awarded each year to the author or authors of the paper which in the judgment of the board of awards is the greatest original contribution to the advancement and use of welding. J. F. Lincoln, president, Lincoln Electric Co., is the donor of the medals.

General Electric Co., Schenectady, N. Y., has appointed Clayton S. Coggeshall general assistant to R. B. Beale, manager of the turbine division, central station department. He was formerly manager of sales of the turbine division, Lynn River works.

The Buda Co., Harvey, Ill., has announced the appointment of J. S. Innes, Ltd., Bay and Torkville streets, Toronto, Ont., Can., as exclusive representative in the Province of Ontario.

Here's NEWS with a big CASH VALUE

The Brooks LOAD LUGGER

Broadside of truck and Brooks LOAD-LUGGER. Note carefully its simple, compact construction . . . absence of complicated "gadgets", cables, sheaves and hydraulic hose.

Because of its unusual design, made possible by years of precision mechanical design experience of our engineering staff . . . the Brooks LOAD-LUGGER requires no counter-weight on front of trucks. Therefore, the cost of carrying dead weight is completely eliminated. Note that all side-swing is completely eliminated by positive guides on buckets. The entire load is carried on the truck chassis, rather than by suspension.

ONE TRUCK WITH A "LITTER" OF BODIES

The Brooks LOAD-LUGGER is an entirely new, revolutionary development in detachable truck buckets. Its low cost will amaze you. In it, our engineers have developed unexpected improvements. In design . . . in operation . . . in original cost . . . in maintenance cost—no other piece of equipment, offered for the same type of service, can touch it.

Only the Brooks LOAD-LUGGER follows the truck manufacturers' recommendations for load distribution. 80% on the rear wheels—20% on the front wheels. The Brooks LOAD-LUGGER has the direct drive from power-take-off and hoist. This feature alone eliminates the frequent, costly replacement of high-pressure hydraulic hose, cables and sheaves. The Brooks LOAD-LUGGER has buckets of one piece construction, insuring long life, and withstands the brutal treatment demanded of such equipment.

Send your Rock Crushing and Pulverizing problems to Brooks Equipment and Mfg. Co., manufacturers of the internationally known DAY "Jaw Type" Rock Crushers, DAY "Swing Hammer" Crushers and DAY Pulverizers . . . a complete line for any desired capacity. DAY Crushers and Pulverizers have been manufactured continuously since 1914 and sold throughout the U.S. and many foreign countries. Complete information furnished on request.

BROOKS EQUIPMENT AND MFG. CO.

Knoxville — A consolidation of Brooks, Payne, Osborne Equipment Co. and Day Pulverizer Co. — Tennessee, U.S.A.

Audubon Wire Cloth Corp., Philadelphia, Penn., has appointed G. J. Hawkey of the Cleveland Duplex Machinery Co., Inc., to handle the sale of all of its products in the Cleveland district.

Dodge Truck Division, Chrysler Corp., Detroit, Mich., has a new general manager, Louis J. Purdy. Mr. Purdy was previously associated with Oakland Motor Car Co., and the Franklin Automobile Co.

Federal Motor Truck Co. has appointed Roy Evans as assistant general sales manager in charge of western territory. He was formerly Chicago district manager for Dodge and previously had been with Chevrolet as regional truck manager.

Davey Compressor Co., Inc., Kent, Ohio, has announced the following appointments: W. R. Clark, mid-western district manager; Stuart G. Smith, eastern district manager; H. B. Owsley, state manager for North and South Carolina; R. L. Garrett, assistant Ohio representative; and G. G. Fisher, formerly assistant Ohio manager, was named Pennsylvania state manager.

Bay City Shovels, Inc., Bay City, Mich., has announced the appointment of Arthur W. Reidinger as advertising and assistant sales manager. Mr. Reidinger was formerly connected with the McGraw-Hill Publishing Co., New York, N. Y., having been on the staff of Engineering News Record and Construction Methods for 16 years.

Trade Literature

The following literature, recently published, is available free, upon request to the respective sponsor:

Electric Drive Selector and Hints on Maintenance.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn. This 12-page publication is arranged particularly for the non-technical or the plant maintenance man. Charts show how to select motors, control and circuit protection, and a section of the pamphlet is devoted to maintenance.

Crushers.—Brooks Equipment & Manufacturing Co., Knoxville, Tenn. Three new bulletins, describing Day crushers now being manufactured and sold by the Brooks company, have been issued. Bulletin No. 999 describes and illustrates No. 0 Model F, No. 10 Model KR, No. 20 Model ER, No. 40 Model MR, and No. 70 Model JR pulverizers or swing hammer crushers. Bulletin No. 884 gives detailed information about the 10- x 20-in. roller bearing crusher, and bulletin No. 957 covers the 9- x 16-in. jaw crusher.

Tractors. — Allis-Chalmers Manufacturing Co., Tractor division, Milwaukee, Wis. Complete information about the Model SO, controlled ignition tractors, is to be found in a recently published 36-page pamphlet. It is profusely illustrated to show the construction details of the engine and various other parts.

Cranes, Steam Locomotive. — Industrial Brownhoist Corp., Bay City, Mich. A 12-page booklet, No. 385, illustrates and describes in considerable detail Nos. 4, 5, and 7, steam locomotive cranes of 20, 25, and 30 tons capacity, respectively, and also shows various applications of this equipment.

Excavator.—The General Excavator Co., Marion, Ohio. Bulletin 3802, illustrates and describes the model 30, of ½-cu. yd. capacity, which is suitable for shovel, crane, dragline, clamshell and other operations.

Drill Rig.—Sullivan Machinery Co., Claremont, N. H. The 4-page pamphlet describes the class UW-161, feather-weight drill rig which uses the L-12 hand-held drill for the drilling machine. The L-12 is run by the new J-5 automatic chain feed.

Crawler Hoist.—Harnischfeger Corp., Milwaukee, Wis. Bulletin X-39, entitled, "P & H Multi-Service Crawler Hoists." The bulletin describes and illustrates the use of this equipment for handling materials and for earth boring and drum hoist applications.

Insulating Fire Brick.—Quigley Co., Inc., New York City. An 8-page illustrated bulletin, No. 328, has been issued, describing the applications of Insulbrix. The new light weight, insulating fire brick are said to combine the advantages of a high refractory and an efficient insulator of low heat storage capacity.

Engines and Power Units.—Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Gasoline engines of various types and capacities are shown in a well-illustrated bulletin, covering the models, W-25, E-60, U-40, and L-90. These units range from 31.5 to 102 m. b. hp.

Engines, Gas.—Worthington Pump and Machinery Corp., Harrison, N. J. Where power users have available natural, manufactured, sewage or refinery gas, the 8-page bulletin S-550-B40 will be particularly interesting. The bulletin describes the vertical, four-cycle, type AG gas engines, and also gives complete specifications with illustrations of typical installations.

Speed Reducer, J.F.S. Variable.—Stephens-Adamson Manufacturing Co., Aurora, Ill.

This is a booklet describing four types of variable speed reducers, including motorized and differential units.

Pushbuttons, Heavy Duty.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn. An 8-page bulletin, W2, describes and illustrates push buttons for heavy duty service on a-c. and d-c. pilot circuits.

Elevator, Bucket.—Sprout, Waldron & Co., Muncy, Penn. Catalog No. 1900 covers the complete bucket elevator line of this company.

"Instruments In Industry."—General Electric Co., Schenectady, N. Y. This is a new house organ which will be issued periodically by the meter division of the company to describe many ways in which electric instruments can bring benefits to industry.

Shovels.—Bay City Shovels, Inc., Bay City, Mich. Two catalogs, 20-B, and 62-B, describe and illustrate, respectively, the model 20 and model 62 units which are convertible for shovel, dragline, clamshell or trench hoe use. The model 20 is of ⅜ cu. yd. capacity and the model 62 is of 1 cu. yd. capacity.

Diesel-electric Generator.—Caterpillar Tractor Co., Peoria, Ill. The 12-page booklet, No. 4658, lists eight sizes of Diesel-powered electric generator sets, ranging in size from 20-kw. to 80-kw. Applications of these units in quarry, mining, and sand and gravel operations are illustrated.

Rectox Rectifiers.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn. Various applications of the direct-current rectifier are described and illustrated in the 12-page pamphlet. The rectifier construction comprises a series of single copper washers, coated with cuprous oxide, which are assembled on an insulated metal bolt, with a soft lead washer next to each oxide surface to insure intimate contact with the oxide. The junction of the cuprous oxide with the base copper has the peculiar property of permitting electrons to pass readily from the copper to the oxide, while preventing their movement in the opposite direction.

Electrical Equipment in Rock Products Industries.—General Electric Co., Schenectady, N. Y. This 16-page illustrated booklet describes applications of all types of electrical equipment in cement mills and quarries.

Ejectors, Steam Jet.—Ingersoll-Rand Co., New York, N. Y. A new bulletin, No. 9046, has been issued covering single, two, and three-stage steam jet ejectors for removing air, gas, or vapors from condensers and vacuum chambers in industrial processes. Included in the 28-page bulletin are applications and characteristics of ejectors, and illustrations showing operation and arrangement of the equipment with either surface or barometric pre-coolers, inter- and after-condensers.

Modern Refractory Practice, the second edition of a book covering every phase of industrial furnace refractories, is a practical handbook and complete catalog in a single volume of 296 pages, 52 illustrations, and 97 charts and tables. The first edition was published in 1929. Over 100 pages have been added to the 1937 edition, 16 full-page furnace drawings have been prepared on the basis of current industrial practice; an entire chapter is devoted to suggestions on the selection, care, and use of refractories; a new arrangement of formulas for calculating brickwork has been included, and there is a fairly complete glossary and selected list of minerals and rocks concerned with refractories. The price of the book is $2.50, but it is offered without charge to users of refractories by HARBISON-WALKER REFRACTORIES CO., Pittsburgh, Penn., the publishers.

Rotary Pumps of various capacities and for different purposes are described and illustrated in a 52-page catalog recently published for distribution by BLACKMER PUMP CO., Grand Rapids, Mich.

Diesel Engines of different types and to meet power problems of many kinds are depicted in a new 12-page, Bulletin VC-29, distributed by BALL-MUNCIE ENGINE CO., Muncie, Ind.

Air compressors, two-stage portable type, are illustrated and fully described in a 24-page catalog recently announced by Sullivan Machinery Co., Michigan City, Ind.

"How to Change Over to Welded Design for Profits" is the title of a new 32-page, well-illustrated bulletin just published by **The Lincoln Electric Co.,** Cleveland, Ohio.

Agitator Drives are described in a new Bulletin No. 601 made available by the FOOTE BROS. GEAR AND MACHINE CORP., Chicago, Ill.

Laboratory equipment of interest to the rock products industry; including pebble, ball and tube mills, mixers, autoclaves, filter presses, dry and wet pans, and mineral working machinery, is shown with specifications of the apparatus in an 8-page bulletin prepared for distribution by THE PATTERSON FOUNDRY & MACHINE CO., East Liverpool, Ohio.

Calcium Chloride Association, 4145 Penobscott Building, Detroit, Mich., announces publication of an attractive bulletin, No. 35, "Better Concrete Curing, High Early Strength and Cold Weather Concreting," summarizing data from engineer authorities on the utility, advantages and economy of calcium chloride use in concrete. The bulletin discusses the nature and importance of curing and its relation to the strength and durability of concrete and outlines the research background of advantages of calcium chloride curing and cold weather concreting. Included are A.S.T.M. standard specifications for admixture and surface curing. The material, prepared for the attention of highway and construction engineers, architects, officials, contractors and manufacturers of concrete products can be had, without charge, by writing the association or member producers direct.

Prices Bid—Contracts Let

OAKLAND, CALIF.: Henry J. Kaiser Co., Oakland, submitted the low bid of $35,800 for 27,000 tons of sand and 39,000 tons of gravel for the Contra Costa Canal, Central Valleys Project, United States Bureau of Reclamation. The sand and gravel will be used in the production of concrete for 17 miles of canal.

•

AUSTIN, TEX.: An award of contracts covering 750,000-bbl. of low heat portland cement for Marshall Ford dam near Austin, Tex., was recently placed by the Department of the Interior with the Longhorn Portland Cement Co., San Antonio, Tex., and the Trinity Portland Cement Co., Dallas, Tex. The Longhorn Portland Cement Co. offered to furnish 375,000 bbl. at a net delivered cost of $1.78 per bbl., while Trinity Portland Cement Co. offered to furnish the entire amount at a net cost of $1.91 per bbl., or any amount less than 500,000 bbl. at a net delivered cost of $1.97 per bbl.

•

GRAND COULEE, WASH.: Six cement companies submitted bids for supplying 200,000 bbl. of cement for the Grand Coulee dam. The bids, which were reported by Bureau of Reclamation's regional office, are based on the shipping point, as follows: Northwestern Portland Cement Co., Seattle, $1.38 per bbl. for 100,000 bbl. only; Superior Portland Cement Co., Seattle, $1.38 per bbl., for full 200,000 bbl.; Oregon Portland Cement Co., Portland, $1.30 per bbl., for 50,000 bbl.; Olympic Portland Cement Co., Seattle, $1.37 per bbl., for full 200,000 bbl.; Spokane Portland Cement Co., Spokane, $1.43 per bbl. for 62,500 bbl.; and Lehigh Portland Cement Co., Chicago, $1.2796 for 500 bbl.

Three companies were awarded contracts, the average delivered prices being as follows: Lehigh Portland Cement Co., 50,000 bbl. at $1.92 per bbl., Spokane Portland Cement Co., at $1.92 per bbl., and Olympic Portland Cement Co., at $2.01 per bbl.

•

MUNCIE, IND.: Delaware County Commissioners recently placed the following gravel contracts in the various townships: Perry—to O. W. Lykins, 1 to 5000 tons at 50c, and J. E. Stone, 1 to 5000 tons at 20c; Washington—to O. W. Lykins, 1 to 5000 tons at 50c, and Paul Benbow, 1 to 8000 tons at 50c; Mt. Pleasant—to O. P. Jones, 1 to 5000 tons at 9c, and Howard Stuart, 1 to 3000 tons at 45c; Salem—to George Davis, 1 to 5000 tons at 9c; Harrison—to Paul Benbow, 1 to 2000 tons at 40c and 1 to 3000 tons at 50c; Salem—to Mr. Sunderland, 1 to 3000 tons at 15c.

•

CHESTER, PENN.: The General Crushed Stone Co., Glen Mills, Penn., was the successful bidder for the majority of items awarded by the highway department of Media Borough. This company will supply the following materials: ½-in. stone chips, $1.80 a ton; ⅜-in. stone chips, $1.90 a ton; ¾-in. crushed stone, $1.70; 1½-in. crushed stone, $1.60; ballast stone, $1.60; HE-1 concrete, $5.05 a ton; HE-6 concrete, $5.30 a ton; stone screenings, $1.15 a ton. Another award was to E. M. Harris for concrete sand, $1.40, and to Asphalt Industries for C-2 asphalt, 10¼c per gal. and H-1 asphalt, 10c per gal.

•

SPOKANE, WASH.: Acme Sand and Gravel Co., has been awarded the sand and gravel contract by the City of Spokane for the asphalt division at a delivered price of $1.25 per cu. yd. The Mutual Revining Co. was awarded the fuel oil contract for the city asphalt plant at $2.14½ per bbl.

•

AMBRIDGE, PENN.: The Ambridge city council recently announced the following low bids: B. Scott McFarland, 642 cu. yd. of limestone concrete, $11.05 per cu. yd.; gravel concrete, $9.80 per cu. yd.; Midland Slag Co., 340 tons of slag at $1.60 per ton, and 60 tons of slag screenings at $1.30 per ton; Ambridge Supply Co., 1428 bbl. of portland cement, $2.34 per bbl. Concrete Products Co., Neville Island, Penn., was the low bidder on reinforced concrete sewer pipe; Bessemer Limestone Co., Pittsburgh, Penn., had the low bid for 700 tons of limestone; and Economy Lumber and Building Co. was low bidder on sand and gravel.

New Towboat

OHIO RIVER SAND CO., INC., Louisville, Ky., is having a new towboat, the "J. H. Duffy," built of all-steel construction. The boat, which measures 131- x 29½- x 8-ft., will be powered by two Busch-Sulzer Diesel engines and is said to be the latest in power boat design. Delivery is expected about May 1.

Bomb Crusher

DYNAMITE thrown into an 8-ton crusher in the quarry owned by Pap McKee, near Eighty-ninth and State Line, Johnson county, Kansas, caused an explosion resulting in $500 damage. Mr. McKee could give no explanation why anyone would have committed the act, and said no labor trouble was involved.

NORTH AMERICAN CEMENT CORP., Albany, N. Y., is reported to have increased its limestone reserve acreage at its Security, Md., plant by acquisition of two farms, comprising 180 acres at a total cost of $22,500.

Concrete Pavement Yardage

AWARDS of concrete pavement for February, 1938, have been announced by the Portland Cement Association as follows:

Type of construction	Sq. yd. awarded during Feb., 1937	Total sq. yds. for year to date, Feb. 26, 1938
Roads	741,341	2,577,649
Streets	466,331	984,219
Alleys	23,811	45,494
Total	1,231,483	3,607,362

Sand-Lime Brick Production and Shipments

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in the various parts of the United States. They may be considered representative of the industry.

Nine active sand-lime brick plants reported for February, and nine for January, statistics for which were published in March.

Average Prices for February

Shipping Point	Plant Price	Delivered Price
Syracuse, N. Y.	$14.00	$16.00 C/L 21.00 L/C
Milwaukee, Wis.	10.00	12.50
Mishawaka, Ind.	10.25	....
St. Louis Park, Minn.	9.50	11.00
Grand Rapids, Mich.	11.00	14.00
Madison, Wis.	....	13.00
Saginaw, Mich.	11.00	....
Watertown, Mass.	9.50	10.50
Minneapolis, Minn.	10.00	....

Statistics for January and February

	Jan.‡	Feb.†
Production	545,410	684,990
Shipments (rail)	238,300	39,000
Shipments (truck)	859,460	1,122,998
Stock on hand	1,917,952	2,274,132
Unfilled orders	995,000	2,628,000

‡ Nine plants reporting; incomplete, five not reporting unfilled orders and two not reporting stock on hand.

† Twelve plants reporting; incomplete, four not reporting unfilled orders and two not reporting stocks on hand.

THE SUPERIOR BRICK CORP., St. Louis Park, Minn., has recorded the use of sand-lime brick in the Municipal Building, Caledonia, Minn., Technological High School, St. Cloud, Minn., and a school building in Deephaven, Minn.

THE PARAGON PLASTER CO., Syracuse, N. Y., reports that the Auburn Prison is using sand-lime brick for its administration and hospital building, also for their auditorium and chapel.

WASHINGTON-IDAHO LIME PRODUCTS Co., Arofino, Idaho, has completed several improvements designed to reduce dust losses. These include raising the height of the stack 40 ft., and housing feeders and conveyors.

COOK STONE CO., Hopkinsville, Ky., has installed a ⅞-cu. yd. Bucyrus-Erie steam shovel in its quarry.

"Sure, I'm a FUNNY GUY ... sometimes!"

"Salesmen say I'm a 'funny guy' . . . have an idea that I never take them seriously. Well, it's all right with me if they keep on thinking so, because I'm a busy man and if I didn't do something to discourage these lads, they'd bother me all day long.

"But I put aside that 'protective mask' of flippancy when I pick up my copy of ROCK PRODUCTS. Then I am serious enough. Those editors know my business. They keep me in touch with trends and developments and give me practical ideas about rock products industries. And I read the ads, too, because I know they are in there because they have something to offer—not because they get editorial publicity. As a matter of fact, the advertising in ROCK PRODUCTS gives me a good steer on which salesmen I *should* take seriously.

"Is it any wonder that I willingly renew my subscription to ROCK PRODUCTS year after year?"

HELTZEL BIN EQUIPMENT . . .

Whenever or wherever storage, batching or bulk cement plants are needed Heltzel-built equipment has always been the leader in point of service, ease of installation, economy of operation and length of service. Portable bins, built to suit the requirements of the concern whose base of operations change from place to place, are the only PORTABLE bins on the market.

Standard Circular, Square and Oblong bins, ranging in capacity from 35 to 500 tons, available in one, two, three and four compartments, featuring convertibility from one to two or three or four compartments without making alterations or changes in weighing or batcher equipment, make specially built or designed equipment almost unnecessary.

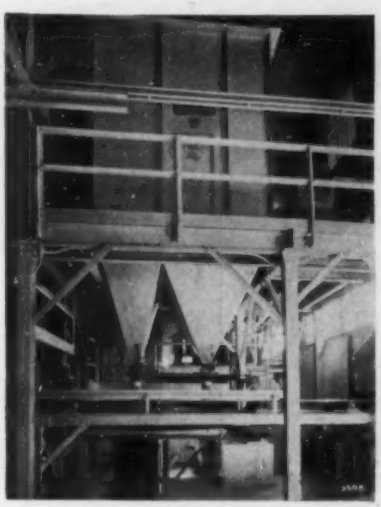
Bulletins S-18-B and S-21-B, describing in detail these plants and their varied applications, are ready. Write today for your copies.

Heltzel
BUILDS IT BETTER

- BINS, Portable and Stationary
- CEMENT BINS, Portable and Stationary
- CENTRAL MIXING PLANTS
- BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)
- BITUMINOUS PAVING FORMS
- ROAD FORMS (with lip curb and integral curb attachments)
- CURB FORMS
- CURB AND GUTTER FORMS
- SIDEWALK FORMS
- SEWER AND TUNNEL FORMS
- SUBGRADE TESTERS
- SUBGRADE PLANERS
- TOOL BOXES
- FINISHING TOOLS FOR CONCRETE ROADS

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

BY *Suppressing the Dust* YOU ELIMINATE PRODUCTION RESISTANCE



Flat cloth bag filter installed in cement plant. Hoppers have continuous dust discharge valves with hopper rappers, discharging into screw conveyor for disposal of collected dust. Capacity sufficient to handle exhausted air from two 3-tube Bates packers, two packer bins and bulk loader.

• Industrial dust is a definite resistance to manufacturing and processing operations and constitutes a factor which reduces business profits.

By installing a Sly dust control system this factor is eliminated and production proceeds at a profit.

Sly dust filters and control systems are based upon the positive action of the cloth flat bag filter—originated by Sly. Equipment made by Sly is backed by over 60 years of manufacturing experience.

A Sly sales engineer is near you and will gladly tell you more.

THE W. W. **SLY** Manufacturing Co.
4700 TRAIN AVE.
CLEVELAND, OHIO

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 110

Admixtures (Aggregate)
Calcium Chloride Ass'n.

Aerial Tramways
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co.
Leschen, A., & Sons Rope Co.
Roeblings, John A., Sons Co.

Aftercoolers (Air)
Chicago Pneumatic Tool Co.

Aggregates (Special)
Calcium Chloride Ass'n.
Tamms Silica Co.

Agitators
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Air Compressors
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
Fuller Co.
Gardner-Denver Co.
General Electric Co.
Nordberg Mfg. Co.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Air Filters
Blaw-Knox Co.
Fuller Co.
Roebling's, John A., Sons Co.
Sly, W. W., Mfg. Co.
Western Precipitation Co.

Air Separators
Babcock & Wilcox Co.
Blaw-Knox Co.
Bradley Pulverizer Co.
Combustion Engr. Corp.
Link-Belt Co.
Raymond Pulv. Div.
Sly, W. W., Mfg. Co.
Smidth, F. L., & Co.
Sturtevant Mill Co.
Western Precipitation Co.
Williams Patent Crusher & Pulv. Co.

Airveyors
Fuller Co.

Alloys (Metal)
Chicago Steel Foundry Co.
Frog, Switch & Mfg. Co.

Ash & Refuse Handling Equipt.
Allen-Sherman Hoff Co.
Haiss, Geo., Mfg. Co.
Hetherinton & Berner, Inc.
Link-Belt Co.
Robins Conveying Belt Co.

Asphalt Mixer Regulators
Hetherington & Berner, Inc.

Asphalt Mixing Plants
Hetherington & Berner, Inc.
Traylor Engineering & Mfg. Co.

Axles
Eagle Iron Works

Babbitt Metal
Allis-Chalmers Mfg. Co.
Dixie Machy. Mfg. Co.
Ryerson, Jos. T., & Son, Inc.

Backdiggers
Lima Locomotive Wks. (Shovel & Crane Div.)
Link-Belt Co.

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Lima Locomotive Wks. (Shovel & Crane Div.)
Link-Belt Co.
Marion Steam Shovel Co.

Bag Cleaning Machines
Link-Belt Co.
Stearns Mfg. Co.

Bag Ties (Wire)
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)

Bagging Machines
Smidth, F. L., & Co.

Balers or Bundling Machines (Sack)
Besser Mfg. Co.
Stearns Mfg. Co.

Balls (Grinding)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Barges
Eagle Iron Works

Batchers, Measuring Volume
Besser Mfg. Co.
Fuller Company
Heltzel Steel Form & Iron Co.
Jaeger Machine Co.
Stearns Mfg. Co.

Battery Chargers
General Electric Co.

Bearing Metals
Allis-Chalmers Mfg. Co.

Bearings (Anti-Friction)
Eagle Iron Works
Hetherington & Berner, Inc.
Link-Belt Co.
Robins Conveying Belt Co.
Ryerson, Jos. T., & Sons, Inc.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bearings (Roller and Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Barber-Greene Co.
Haiss, Geo., Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Thermoid Rubber Co.

Belting (Transmission)
Bacon, Earle C., Co.
Haiss, Geo., Mfg. Co.
Link-Belt Co.
Smidth, F. L., & Co.
Thermoid Rubber Co.

Belting (V Type)
Allis-Chalmers Mfg. Co.
Link-Belt Co.
Thermoid Rubber Co.

Belt Fasteners or Hooks
Armstrong-Bray & Co.
Flexible Steel Lacing Co.
Robins Conveying Belt Co.

Belt Idlers
Link Belt Co.
Robins Conveying Belt Co.
Smith Engineering Wks.

Belt Lacing
Armstrong-Bray & Co.
Bristol Co.
Flexible Steel Lacing Co.

Belt Lacing Machines
Armstrong-Bray & Co.

Belt Tighteners
Robins Conveying Belt Co.

Belt Trippers
Bacon, Earle Co., Inc.
Link-Belt Co.
Robins Conveying Belt Co.

Bin Gates
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Besser Mfg. Co.
Fuller Co.
Geo. Haiss Mfg. Co., Inc.
Heltzel Steel Form & Iron Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Link-Belt Co.
McLanahan & Stone Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Engineering & Mfg. Co.

Bin Indicators
Fuller Co.

Bins (Storage)
Allen-Sherman-Hoff Co.
Austin-Western Road Machy. Co.
Besser Mfg. Co.
Blaw-Knox Co.
Eagle Iron Works
Heltzel Steel Form & Iron Co.
Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.

Blasting Caps
Atlas Powder Co.
Du Pont, E. I., de Nemours & Co., Inc.
Hercules Powder Co.

Blasting Cap Crimpers
Ensign-Bickford Co.

Blasting Machines
Atlas Powder Co.
Du Pont, E. I., de Nemours & Co., Inc.
Hercules Powder Co.

Blasting Supplies
Atlas Powder Co.
Du Pont, E. I., de Nemours & Co., Inc.
Ensign-Bickford Co.
Hercules Powder Co.

Block Machines, Building
Anchor Concrete Machinery Co.
Besser Mfg. Co.
Multiplex Concrete Machy Co.
R & L Concrete Machy. Co.
Stearns Mfg. Co.

Blocks (Pillow)
Allis-Chalmers Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Blocks (Sheave)
Haiss, Geo., Mfg. Co.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Roeblings, John A., Sons Co.
Sauerman Bros.

Blowers
Allis-Chalmers Mfg. Co.
Sly, W. W., Mfg. Co.

Boats (Self-Unloading)
Link-Belt Co.
Robins Conveying Belt Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Bolts
Standard Pressed Steel Co.

Bond Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)

Brick Machines
Besser Mfg. Co.
Multiplex Concrete Mach. Co.
R & L Concrete Machinery Co.
Stearns Mfg. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Bucyrus-Erie Co.
Geo. Haiss Mfg. Co., Inc.
Hayward Company
Industrial Brownhoist Corp.
Jaeger Machine Co.
Link-Belt Co.
Owen Bucket Co.
Robins Conveying Belt Co.

Buckets (Dragline and Slackline)
Austin-Western Road Machy. Co.
Besser Mfg. Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Hayward Company
Hendrick Mfg. Co.
Link-Belt Co.
Owen Bucket Co.
Pioneer Engineering Wks., Inc.
Sauerman Bros., Inc.

Buckets (Dredge & Excavator)
Bucyrus-Erie Co.
Haiss, Geo., Mfg. Co.
Hayward Co.
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Bacon, Earle C., Co.
Haiss, Geo., Mfg. Co.
Hendrick Mfg. Co.
Huron Industries, Inc.
Industrial Brownhoist Corp.
Jaeger Machine Co.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Smith Engr. Wks.

Buckets (Tramway)
American Steel & Wire Co. (U. S. Steel Corp. Susi.)

Building Tile Machines
Besser Mfg. Co.
Multiplex Concrete Machy. Co.
R & L Concrete Machy. Co.
Stearns Mfg. Co.

Bulk Cement Batching Plant
Heltzel Steel Form & Iron Co.

Bulk Cement Storage Plants
Heltzel Steel Form & Iron Co.

Bulldozers
Blaw-Knox Co.
Bucyrus-Erie Co.

Bullscrapers
Bucyrus-Erie Co.

Bushings
Eagle Iron Wks.
Link-Belt Co.

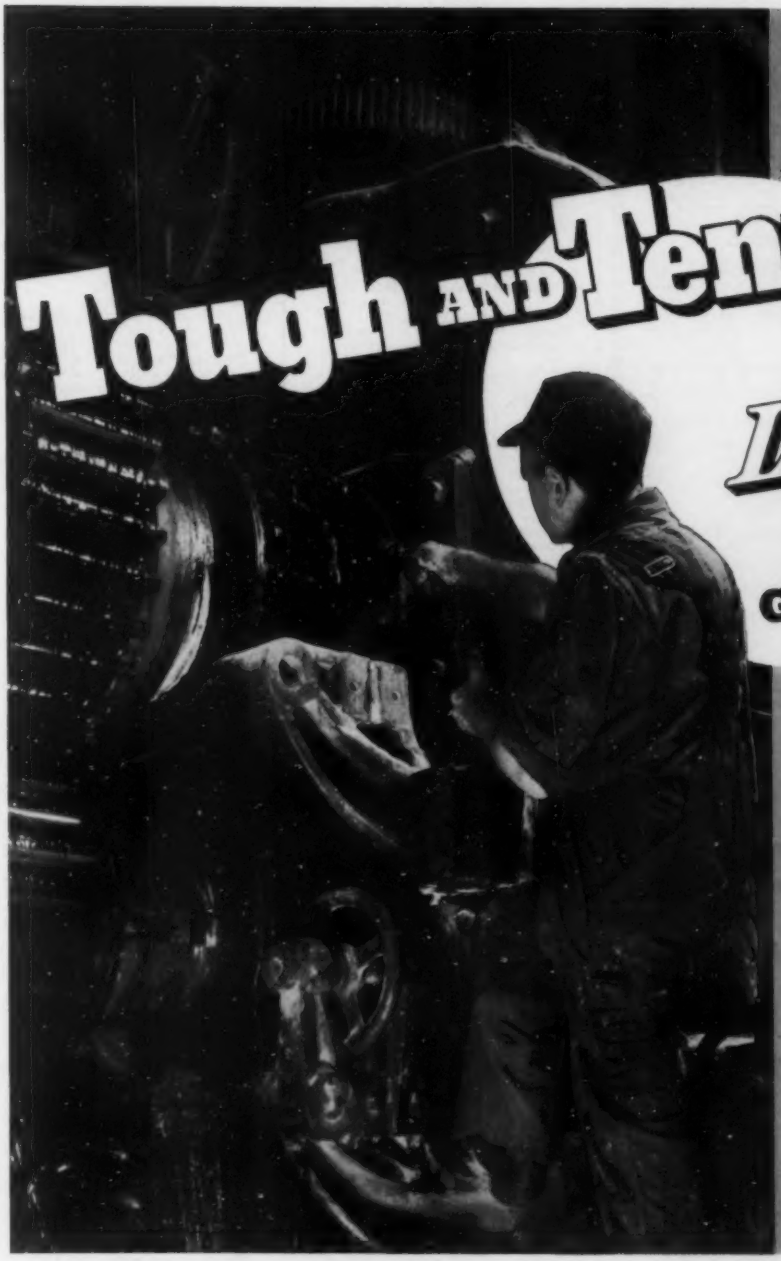
Cableways
American Cable Co. Inc.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Blaw-Knox Co.
Broderick & Bascom Rope Co (Yellow Strand)
General Electric Co.
Leschen, A., & Sons Rope Co.
Link-Belt Co.
Roebling's, John A., Sons Co.
Sauerman Bros.

Calcining Equipment
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bradley Pulv. Co.
Calcium Chloride Ass'n.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Calcium Chloride
Calcium Chloride Ass'n.

Capstans
Link-Belt Co.
Robins Conveying Belt Co.

Cars (Block, Dump, Industrial, Etc.)
Austin-Western Road Machy. Co.
Besser Mfg. Co.
Eagle Iron Works
Link-Belt Co.
Multiplex Concrete Mach. Co.
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.



Tough AND Tenacious

GULF LUBCOTE IS THE IDEAL GEAR LUBRICANT

FOUR REASONS... WHY GULF LUBCOTE IS THE LUBRICANT OF UNPARALLELED QUALITY FOR OPEN GEARS

1 GULF LUBCOTES are heavy bodied products especially manufactured to have the requisite property of high adhesiveness for metal surfaces necessary in lubricants for open gears.

2 Due to selected crudes used and to the process of refinement employed, GULF LUBCOTES possess unusual lubricating qualities together with the essential property of flowing with the movement of the gear and pinion teeth.

3 The lubricating film provided by GULF LUBCOTES, in addition to being impervious to moisture, acid fumes and gases, will withstand extreme temperature changes without deterioration.

4 Due to the tough and tenacious nature of GULF LUBCOTES they will effectively reduce objectionable gear noise and at the same time will provide maximum protection against corrosion, pitting or excessive wear of the gear teeth.

EASY TO APPLY... LONG LASTING

WHEN you put it on, *it stays on!* That's one of the characteristics which make Gulf Lubcote the ideal gear lubricant. This heavy-bodied lubricant has great adhesiveness, yet it is sufficiently mobile to insure proper spreading between sliding surfaces under heavy pressures.

Gulf Lubcote will not dry up, crack, or peel off of gears. It does not gum or harden with age, nor is its efficiency impaired by climatic changes.

Try this tough, tenacious lubricant for your gear trains. It is made in seven grades to fit various gear types, open or enclosed, and to provide for a wide range of operating conditions.

Gulf Oil Corporation • Gulf Refining Company

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

GULF INDUSTRIAL LUBRICATION

Classified Directory—*Continued*

Car Doors, Fibre (Leak Proof)
Hummel-Foley Corp.

Car Dumps
Eagle Iron Wks.
Link-Belt Co.

Car Liners
Hummel-Foley Corp.

Car Pullers & Movers
Appleton-Atlas Car Mover Corp.
Link-Belt Co.
Robins Conveying Belt Co.

Car Wheels
Eagle Iron Wks.
Link-Belt Co.

Car Wrenches
Appleton-Atlas Car Mover Corp.

Castings
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bacon, Earle C., Co.
Blaw-Knox Co.
Chicago Steel Foundry Co.
Dixie Machinery Mfg. Co.
Eagle Iron Works (Grey Iron)
Frog, Switch & Mfg. Co.
Hetherington & Berner, Inc.
Huron Industries, Inc.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co
McLanahan & Stone Corp.
Robins Conveying Belt Co.
Smidth, F. L., & Co.
Timken Roller Bearing Co
Traylor Engineering & Mfg. Co.

Cement Plants (Contractor)
Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Cement Colors
Mepham, Geo. S., Corp.
Tamms Silica Co.

Cement Paints
Tamms Silica Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
Smidth, F. L., & Co.

Central Mixing Plants (Concrete)
Blaw Knox Co.
Heltzel Steel Form & Iron Co.
Jaeger Machine Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Link-Belt Co.

Chain (Elevating and Conveying)
Bacon, Earle C., Co.
Haiss, Geo., Mfg. Co.
Link-Belt Co.

Chimney Block Machines and Molds
Besser Mfg. Co.

Chutes (Bin, Truck, Concrete, Etc.)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earl C. Bacon, Inc.
Blaw-Knox Co.
Eagle Iron Works
Haiss, Geo., Mfg. Co.
Hendrick Mfg. Co.
Jaeger Machine Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Ross Screen & Feeder Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Chute Liners
Bacon, Earle C., Inc.
Haiss, Geo., Mfg. Co.
Hendrick Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Robins Conveying Belt Co.
Smidth, F. L., & Co.

Circuit Breakers
Allis-Chalmers Mfg. Co.
General Electric Co.

Circuit Testers
General Electric Co.
Hercules Powder Co.

Clarifiers
Link-Belt Co.

Classifiers
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bradley Pulv. Co.
Eagle Iron Works
Lewistown Fdry. & Mach. Co.
Link-Belt Co.
Nordberg Manufacturing Co.
Pioneer Engineering Wks., Inc.
Raymond Pulverizer Division
Sly, W. W., Mfg. Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.
Universal Vibr. Screen Co.
Western Precipitation Co.
Williams Patent Crusher & Pulv. Co.

Clutches
Allis-Chalmers Mfg. Co.
Link-Belt Co.

Coal Pulverizing Equipment
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Bradley Pulv. Co.
Link-Belt Co.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Concrete Mixers
Anchor Concrete Machy. Co.
Besser Mfg. Co.
Blaw-Knox Co.
Jaeger Machine Co.
Multiplex Concrete Machy. Co.
Stearns Mfg. Co.

Concrete Waterproofing & Dampproofing
Tamms Silica Co.

Controllers (Electric)
Allis-Chalmers Mfg. Co.
General Electric Co.

Converters (Electric)
Allis-Chalmers Mfg. Co.
General Electric Co.

Conveyors (Apron)
Allis-Chalmers Mfg. Co.
Barber-Greene Co.
Link-Belt Co.
Robins Conveying Belt Co.
Traylor Engr. & Mfg. Co.

Conveyors (Belt)
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon
Barber-Greene Co.
Besser Mfg. Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Hendrick Mfg. Co.
Huron Industries, Inc.
Industrial Brownhoist Corp.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Multiplex Concrete Mach. Co.
New Holland Machine Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Stearns Mfg. Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Conveyors (Hydro Vacuum)
Allen-Sherman Hoff Co.

Conveyors (Pan)
Allis-Chalmers Mfg. Co.
Link-Belt Co.

Conveyors (Pneumatic)
Fuller Company
Raymond Pulverizer Division

Classified Directory—*Continued*

Conveyors (Screw)
Besser Mfg. Co.
Eagle Iron Works
Link-Belt Co.

Conveyors (Trolley)
Link-Belt Co.

Conveyors (Vibrating)
Allis-Chalmers Mfg. Co.
Link-Belt Co.
Smidth, F. L., & Co.

Conveyor Idlers & Rolls
Austin-Western Road Machy. Co.
Bacon, Earle C., Inc.
Barber-Greene Co.
Haiss, Geo., Mfg. Co.
Huron Industries, Inc.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Smidth, F. L., & Co.

Coolers
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Link-Belt Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Allis-Chalmers Mfg. Co.
Huron Industries, Inc.
Link-Belt Co.
Robins Conveying Belt Co.
Standard Pressed Steel Co.

Cranes, Crawler & Locomotive (Diesel, Electric, Gasoline & Steam)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Universal Crusher Co.

Cranes (Overhead Traveling Electric)
Industrial Brownhoist Corp.

Cranes (Tractor)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co.

Crawler Attachments
Allis-Chalmers Mfg. Co.
Link-Belt Co.

Crawling Tractor Excavators
Austin-Western Road Machy. Co.
Link-Belt Co.

Crusher Parts
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bacon, Earle C., Co.
Dixie Machinery Mfg. Co.
Eagle Iron Works
McLanahan & Stone Corp.
Pennsylvania Crusher Co.
Pioneer Engineering Wks., Inc.
Traylor Engr. & Mfg. Co.
Universal Crusher Co.

Crushers (Hammer)
Allis-Chalmers Mfg. Co.
American Pulv. Co.
Austin-Western Road Machy. Co.
Bradley Pulv. Co.
Brooks Equipment & Mfg. Co.
Dixie Machy. Mfg. Co.
Sturtevant Mill Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc.
Dixie Machinery Mfg. Co.
Lewistown Fdy. & Mach. Co. (Jaw)
McLanahan & Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Pioneer Engineering Wks., Inc.
Smith Engineering Works
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Laboratory)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bacon, Earle C., Co.
Dixie Machinery Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Primary Breakers)
Allis-Chalmers Mfg. Co.
Smith Engr. Wks.
Traylor Engr. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Inc.
Smith Engr. Wks.
Traylor Engr. & Mfg. Co.

Crushers (Ring)
American Pulverizer Co.
Dixie Machinery Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Roll)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Bacon, Earle C., Co.
Besser Mfg. Co.
Brooks Equipment & Mfg. Co.
Eagle Iron Works
Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
Pennsylvania Crusher Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Smith Engineering Works
Sturtevant Mill o.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushing and Screening Plants (Portable)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Barber-Greene Co.
Blaw-Knox Co.
Dixie Machinery Mfg. Co.
Eagle Iron Works
Heltzel Steel Form & Iron Co.
Link-Belt Co.
Pennsylvania Crusher Co.
Pioneer Engineering Wks., Inc.
Smith Engineering Works
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Curing Racks
Besser Mfg. Co.
Multiplex Concrete Machy. Co.
Stearns Mfg. Co.

Dedusters
Blaw-Knox Co.
Western Precipitation Co.

Dehydrators
Pioneer Engineering Wks., Inc.

Derricks
Hayward Company

Detonators
Atlas Powder Co.
duPont, E. I., de Nemours Co.
Ensign-Bickford Co.
Hercules Powder Co.

Dewatering Machines
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Jaeger Machine Co.
Link-Belt Co.
Morris Machine Works

Classified Directory—*Continued*

Diaphragms (Rubber)
Jaeger Machine Co.

Dippers & Teeth (Dredge & Shovel
Bucyrus-Erie Co.
Frog, Switch & Mfg. Co.
Link-Belt Co.
Marion Steam Shovel Co.

Disentegrators
Smidth, F. L., & Co.

Ditchers
Barber-Greene Co.
Bucyrus-Erie Co.
Marion Steam Shovel Co.

Dragline Cableway Excavators
American Cable Co.
Austin-Western Road Machy. Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engr. Co.
Sauerman Bros., Inc.

Dredges
Bucyrus-Erie Co.
Eagle Iron Works
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Link-Belt Co.
Marion Steam Shovel Co.
Morris Machine Works

Dredge Cutter Heads & Ladders
Eagle Iron Wks.
Hetherington & Berner, Inc.

Dredge Hulls
Eagle Iron Wks.

Dredge Pumps
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Bucyrus-Erie Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Wks.
Wilfley, A. R., & Sons, Inc.

Dredging Sleeves
Hetherington & Berner, Inc.
Thermoid Rubber Co.

Drills (Blast Hole)
Bucyrus-Erie Co.
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drills (Hand Hammer)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drills (Rock)
Bucyrus-Erie Co.
Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Timken Roller Bearing Co

Drills (Well)
Bucyrus-Erie Co.

Drill Bits
Bucyrus-Erie Co.
Chicago Pneumatic Tool Co.
Timken Roller Bearing Co.

Drill Sharpening Machines
Bucyrus-Erie Co.
Gardner-Denver Co.

Drill Steel
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drilling
Chicago Pneumatic Tool Co.

Drilling Accessories
Bucyrus-Erie Co.
Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Timken Roller Bearing Co.

Drives (Belt, Chain and Rope)
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Link-Belt Co.
Smidth, F. L., & Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Link-Belt Co.
Smidth, F. L., & Co.

Drives (Worm)
Link-Belt Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Blaw-Knox Co.
Combustion Engineering Corp.
Hetherington & Berner, Inc.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Raymond Pulverizer Division
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.
Tyler, W. S., Co.
Western Precipitation Co.
Williams Patent Crusher & Pulv. Co.

Dust Collecting Systems
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Blaw Knox Co.
Hendrick Mfg. Co.
Raymond Pulverizer Division
Sly, W. W., Mfg. Co.
Smidth, F. L., & Co.
Western Precipitation Co.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
Blaw-Knox Co.
Fuller Company
Sly, W. W., Mfg. Co.
Western Precipitation Co.

Dust Precipitators
Western Precipitation Co.

Dust Collector Bags
Blaw-Knox Co.
Sly, W. W., Mfg. Co.

Dust Recovery Plants
Sly, W. W., Mfg. Co.
Western Precipitation Co.

Dynamite
Atlas Powder Co.
duPont, E. I., de Nemours Co.
Hercules Powder Co.

Electric Motors
Allis-Chalmers Mfg. Co.
General Electric Co.

Electric Motor Starters
Allis-Chalmers Mfg. Co.
General Electric Co.

Elevators
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Barber-Greene Co.
Besser Mfg. Co.
Eagle Iron Works
Fuller Company
Haiss, Geo., Mfg. Co.
Hendrick Mfg. Co.
Huron Industric, Inc.
Industrial Brownhoist Corp.
Jaeger Machine Co.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Multiplex Concrete Mach. Co.
New Holland Machine Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Smidth, F. L., & Co.
Smith Engineering Works
Stearns Mfg. Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Engineers
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Blaw-Knox Co.
Bradley Pulv. Co.
Fuller Co.
Hetherington & Berner, Inc.
Link-Belt Co.
McLanahan & Stone Corp.
Morris Machine Works
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Standard Oil Co. (Ind.)
Sturtevant Mill Co.
Traylor Engineering & Mfg Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel, Gasoline, Kerosene and Oil)
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
National Supply Co.
New Holland Machine Co.
Nordberg Mfg. Co.

Classified Directory—*Continued*

Engines (Natural Gas)
Allis-Chalmers Mfg. Co.

Engines (Steam)
Allis-Chalmers Mfg. Co.
Morris Machine Works
Nordberg Mfg. Co.

Exhauster
Combustion Engineering Co.
Raymond Pulverizer Division

Explosives
Atlas Powder Co.
duPont, E. I., de Nemours Co.
Hercules Powder Co.

Fans (Exhaust)
Blaw-Knox Co.
General Electric Co.
Sly, W. W., Mfg. Co.
Smidth, F. L., & Co.

Feeders
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Barle C Bacon, Inc.
Barber-Greene Co.
Besser Mfg. Co.
Blaw-Knox Co.
Bradley Pulv. Co.
Fuller Co.
Hetherington & Berner, Inc.
Huron Industries, Inc.
Link-Belt Co.
Pennsylvania Crusher Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Ross Screen & Feeder Co.
Smidth, F. L., & Co.
Smith Engr. Wks.
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.

Fence (Wire)
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Roebling's, John A., Sons Co.

Fence Posts
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)

Filter Cloth
Roebling's, John A., Sons Co.
Tyler, W. S., Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman Hoff Co.

Forges
Gardner-Denver Co.

Forgings
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.

Fuels (Diesel)
Texas Co.

Fuses (Detonating and Safety)
Atlas Powder Co.
Ensign-Bickford Co.
Hercules Powder Co.

Fuses (Electric)
General Electric Co.

Fuse Cutters
Ensign-Bickford Co.

Fuse Lighters
Ensign-Bickford Co.

Galvanometers
General Electric Co.
Hercules Powder Co.

Gasoline
Gulf Refining Co.
Standard Oil Co. (Ind.)
Texas Company

Gears
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Frog, Switch & Mfg. Co.
General Electric Co.
Haiss, Geo., Mfg. Co.
Huron Industries, Inc.
Link-Belt Co.
Robins Conveying Belt Co.
Traylor Engineering & Mfg. Co.

Generators & Motor Generator Sets
Allis-Chalmers Mfg. Co.
General Electric Co.
National Supply Co.
Nordberg Mfg. Co.

Glass Sand Equipment
Lewistown Fdry. & Mach. Co.

Grapples
Blaw Knox Co.
Bucyrus-Erie Co.
Hayward Co.
Owen Bucket Co.

Grease
Bacon, Earle C., Co.
Gulf Refining Co.
Standard Oil Co. (Ind.)
Texas Company

Grease Cups
Link-Belt Co.
Robins Conveying Belt Co.

Guards (Lamp)
Flexible Steel Lacing Co.

Guards (Machinery)
Harrington & King Perforating Co.
Tyler, W. S., Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Morris Machine Works

Gypsum Plants
Traylor Engr. & Mfg. Co.

Haulage Systems (Electric)
General Electric Co.

Haulage Systems (Remote Control)
General Electric Co.

Hoists (Chain, Electric, Portable, Skip, Etc.)
Allis-Chalmers Mfg. Co.
Besser Mfg. Co.
Chicago Pneumatic Tool Co.
Commercial Shearing & Stamping Co.
Eagle Iron Works
Gardner-Denver Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Link-Belt Co.
McLanahan & Stone Corp.
Nordberg Mfg. Co.
Northwest Engineering Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Sauerman Bros., Inc.
Smith Engr. Wks.
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.

Hoppers
Austin-Western Road Machy. Co.
Besser Mfg. Co.
Blaw-Knox Co.
Hendrick Mfg. Co.
Jaeger Machine Co.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Traylor Engineering & Mfg. Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Chicago Pneumatic Tool Co.
Dixie Machinery Mfg. Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Works
Thermoid Rubber Co.

Hose Clamps
Chicago Pneumatic Tool Co.

Hose Couplings
Chicago Pneumatic Tool Co.

Hydrators (Lime)
Blaw-Knox Co.
Traylor Engr. & Mfg. Co.

Jigs (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Traylor Engineering & Mfg. Co.

Joist & Slab Machines (Concrete)
R & L Concrete Machy. Co.

Kerosene
Standard Oil Co. (Ind.)

Kilns Parts
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Chicago Steel Foundry Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Classified Directory—*Continued*

Kilns (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Kilns (Vertical)
Blaw-Knox Co.

Kiln Burners
Babcock & Wilcox Co.
Smidth, F. L., & Co.

Kiln Chain Systems
Smidth, F. L., & Co.

Kiln Liners (Metal)
Traylor Engr. & Mfg. Co.

Kominuters
Smidth, F. L., & Co.

Laoratory Apparatus
Smidth, F. L., & Co.

Lime Handling Equipment
Fuller Co.
Link-Belt Co.
Raymond Pulv. Div.
Robins Conveying Belt Co.

Lime Plants
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Blaw-Knox Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Loaders (Bin, Car, Hopper, Truck, Etc.)
Barber-Greene Co.
Besser Mfg. Co.
Bucyrus-Erie Co.
Fuller Company
Gardner-Denver Co.
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.
Marion Steam Shovel Co.
New Holland Machine Co.
Northwest Engineering Co.
Robins Conveying Belt
Ross Screen & Feeder Co.
Stearns Mfg. Co.

Loaders (Boat)
Link-Belt Co.

Loaders (Box Car)
Barber-Greene Co.
Link-Belt Co.
Ottumwa Box Car Loader Co.

Loaders (Underground)
Allis-Chalmers Mfg. Co.
Nordberg Mfg. Co.

Locomotives (Diesel and Diesel-Electric)
Davenport-Besler Corp.

Locomotives (Electric, Trolley & Storage Battery)
Davenport-Besler Corp.
General Electric Co.

Locomotives (Gasoline and Gas-Electric)
Davenport-Besler Corp.

Locomotives (Oil & Oil-Electric)
General Electric Co.

Locomotives (Steam)
Davenport-Besler Corp.

Locomotive Stack Netting
Tyler, W. S., Co.

Magnets
General Electric Co.

Manganese Steel Parts
Bacon, Earle C., Inc.
Frog, Switch & Mfg. Co.

Material Handling Equipment
Allen-Sherman-Hoff Co.
Austin-Western Road Machy. Co.
Barber-Greene Co.
Fuller Company
Heltzel Steel Form & Iron Co.
Link-Belt Co.
Raymond Pulverizer Division
Robins Conveying Belt Co.

Measuring Devices
Blaw-Knox Co.
General Electric Co.
Jaeger Machine Co.

Mechanical Rubber Goods
Thermoid Rubber Co.

Mill Parts
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Mills, Grinding (Ball, Tube, Hammer, Rod, Roll, Etc.) (See also Pulverizers)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bradley Pulv. Co.
Brooks Equipment & Mfg. Co.
Dixie Machinery Mfg. Co.
Lewistown Foundry & Mach. Co.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Smidth, F. L., & Co.
Traylor Engr. & Mfg. Co.

Mortar Mixers
Eagle Iron Works
Jaeger Machine Co.

Mortar Colors
Mepham, Geo. S., Corp.
Tamms Silica Co.

Nails
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)

Nozzles (Gravel Washing)
Link-Belt Co.

Nuts
Standard Pressed Steel Co.

Oils (Lubricating)
Bacon, Earle C., Inc.
Chicago Pneumatic Tool Co.
Gulf Refining Co.
Robins Conveying Belt Co.
Standard Oil Co. (Ind.)
The Texas Co.

Oils (Cutting)
The Texas Co.

Ornamental Forms (Concrete)
Besser Mfg. Co.

Packings
Thermoid Rubber Co.

Pallets
Anchor Concrete Machinery Co.
Bacon, Earle C., Inc.
Besser Mfg. Co.
Commercial Shearing and Stamping Co.
Multiplex Concrete Machy Co.
Stearns Mfg. Co.

Pans, Grinding (Wet & Dry)
Eagle Iron Works
Traylor Engineering & Mfg. Co.

Perforated Metal
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Chicago Perforating Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Joseph T. Ryerson & Son, Inc.
Traylor Engr. & Mfg. Co.

Pinions
Bacon, Earle C., Inc.
Frog, Switch & Mfg. Co.
General Electric Co.
Haiss, Geo., Mfg. Co.
Huron Industries, Inc.
Link-Belt Co.

Pipe Molds and Machines (Concrete)
Besser Mfg. Co.
Concrete Pipe Machy. Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.
Stearns Mfg. Co.

Pipe
Frog, Switch & Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works

Pipe Fittings
Hetherington & Berner, Inc.

Plaster Colors
Mepham, Geo. S., Corp.

Classified Directory—*Continued*

Pontoons
Eagle Iron Works
Morris Machine Works

Powder (Blasting)
Atlas Powder Co.
duPont, E. I., de Nemours Co.
Hercules Powder Co.

Powder Magazines
Hercules Powder Co.

Pulleys
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Huron Industries, Inc.
Link-Belt Co.
Robins Conveying Belt Co.

Pulverizer Parts
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Dixie Machinery Mfg. Co.
Smidth, F. L., & Co.

Pulverizers (Hammer, Ring, Rod & Roll) (See Also Mills & Crushers)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Blaw-Knox Co.
Bradley Pulv. Co.
Brooks Equipment & Mfg. Co.
Combustion Engr. Corp.
Dixie Machy. Mfg. Co.
Lewistown Foundry & Mach. Co.
New Holland Machine Co.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Centrifugal)
Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Deep Well)
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
Morris Machine Wks.

Pumps (Diaphragm)
Jaeger Machine Co.

Pumps (Pulverized Material)
Babcock & Wilcox Co.
Fuller Company
Morris Machine Works
Smidth, F. L., & Co.

Pumps (Vacuum)
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
Fuller Company
Gardner-Denver Co.
Smidtn, F. L., & Co.

Pump Valves (Pulverized Material)
Fuller Co.

Railway Equipment
General Electric Co.

Railways (Electric)
General Electric Co.

Rectifiers
Allis-Chalmers Mfg. Co.
General Electric Co.

Recuperators
Traylor Engineering & Mfg. Co.

Refractories
Smidth, F. L., & Co.

Regulators (Voltage)
Allis-Chalmers Mfg. Co.
General Electric Co.

Rewashers (Screw)
Link-Belt Co.
Smith Engineering Works

Roofing
Ryerson, Jos. T., & Son, Inc.
Texas Co.

Rope (Transmission)
Allis-Chalmers Mfg. Co.

Sand Drags
Eagle Iron Wks.
Link-Belt Co.
Smith Engr. Wks.

Sand and Gravel Plants
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Eagle Iron Works
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Traylor Engineering & Mfg. Co.

Sand Separators
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Smith Engineering Wks.

Sand Settling Tanks
Eagle Iron Wks.
Hendrick Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Pioneer Engineering Wks., Inc.
Smith Engr. Wks.

Scales (Hopper)
Blaw-Knox Co.

Scrapers (Power Drag)
Austin-Western Road Machy. Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Hayward Company
Link-Belt Co.
Northwest Engineering Co.
Pioneer Engineering Wks., Inc.
Sauerman Bros., Inc.

Screen Parts
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Hendrick Mfg. Co.
Pioneer Engineering Wks., Inc.
Screen Equipment Co.
Traylor Engineering & Mfg. Co.

Screens (Grizzly)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Eagle Iron Works
Hendrick Mfg. Co.
Huron Industries, Inc.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Productive Equipment Corp.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Ross Screen & Feeder Co.
Smith Engineering Works
Traylor Engineering & Mfg. Co.
Tyler, W. S., Co.
Universal Vibrating Screen Co.

Screens (Laboratory)
Allis-Chalmers Mfg. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Roebling's, John A., Sons Co.
Smidth, F. L., & Co.
Tyler, W. S., Co.
Williams Patent Crusher & Pulv. Co.

Screens (Revolving)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Inc.
Eagle Iron Wks.
Haiss, Geo., Mfg. Co., Inc.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Smith Engr. Wks.
Traylor Engr. & Mfg. Co.
Tyler, W. S., Co.

Screens, Scalping
Allis-Chalmers Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Screens (Trommel)
Traylor Engr. & Mfg. Co.

Screens (Vibrating)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Eagle Iron Works
Hendrick Mfg. Co.
Lewistown Fdry. & Mach. Co.
Huron Industries, Inc.
Link-Belt Co.

Classified Directory—*Continued*

McLanahan & Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Screen Equipment Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Crusher Co.
Universal Vib. Screen Co.
Williams Patent Crusher & Pulv. Co.

Screws (Cap, Self Locking, Set, Hollow Set)
Standard Pressed Steel Co.

Seal Rings
Huron Industries, Inc.
Traylor Engineering & Mfg. Co.

Shafting
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Inc.
Link-Belt Co.

Shale Planers
Eagle Iron Wks.

Sheaves
Allis-Chalmers Mfg. Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Eagle Iron Works
Haiss, Geo., Mfg. Co.
Hetherington & Berner, Inc.
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Roebling's, John A., Sons Co.
Sauerman Bros.

Shovels (Compressed Air)
Nordberg Mfg. Co.

Shovels, Power (Diesel, Diesel-Air, Electric, Gasoline, Gas-Electric, Oil & Steam)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.

Shovels (Tractor)
Austin-Western Road Machy. Co.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Link-Belt Co.

Shovels (Underground)
Allis-Chalmers Mfg. Co.
Lima Locomotive Wks., Inc. (Shovel & Crane Div.)
Nordberg Mfg. Co.

Shredders
Williams Patent Crusher & Pulv. Co.

Sieves (Testing)
Hendrick Mfg. Co.
Roebling's, John A., Sons Co.
Smidth, F. L., & Co.
Tyler, W. S., Co.

Silos
Blaw-Knox Co.
F. L. Smidth & Co.

Silo Stave Machines (Concrete)
Besser Mfg. Co.

Slakers (Rotary)
Traylor Engineering & Mfg. Co.

Slugs (Grinding)
Smidth, F. L., & Co.

Slurry Mixers
Smidth, F. L., & Co.
Traylor Engr. & Mfg. Co.

Slurry Pumps
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Morris Machine Wks.
Smidth, F. L., & Co.
Wilfley, A. R., & Sons, Inc.

Slurry Pump Valves
Fuller Co.
Wilfley, A. R., & Sons, Inc.

Slurry Separators
Smidth, F. L., & Co.

Slurry Thickeners
Smidth, F. L., & Co.
Traylor Engr. & Mfg. Co.

Smokestacks
Hendrick Mfg. Co.
Traylor Engineering & Mfg. Co.

Speed Reducers
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Huron Industries, Inc.
Link-Belt Co.
Smidth, F. L., & Co.
Traylor Engineering & Mfg. Co.

Spouts
Link-Belt Co.
Traylor Engineering & Mfg. Co.

Sprockets
Allis-Chalmers Mfg. Co.
Bacon, Earle C., Co.
Link-Belt Co.

Standpipes
Ross Screen & Feeder Co.

Steel, Abrasion Resisting
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Chicago Steel Foundry Co.
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Chicago Steel Foundry Co.
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.
Link-Belt Co.

Storage Equipment
Barber-Greene Co.
Blaw-Knox Co.
Haiss, Geo., Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.
Sauerman Bros., Inc.

Stucco Colors
Mepham, Geo. S., Corp.

Switchboards
Allis-Chalmers Mfg. Co.
General Electric Co.

Tachometers
General Electric Co.

Tampers (Power & Hand)
Besser Mfg. Co.
Multiplex Concrete Machy Co.
Stearns Mfg. Co.

Tanks
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Chicago Pneumatic Tool Co.
Combustion Engineering Corp.
Eagle Iron Works
Heltzel Steel Form & Iron Co.
Hendrick Mfg. Co.
Link-Belt Co.
Pioneer Engineering Wks., Inc.
Raymond Pulverizer Division
Traylor Engineering & Mfg. Co.

Towers
Blaw-Knox Co.
Eagle Iron Works
Hendrick Mfg. Co.
Jaeger Machine Co.
Robins Conveying Belt Co.
Sauerman Bros., Inc.

Track & Track Equipment
Besser Mfg. Co.
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Track Systems (Overhead)
Link-Belt Co.

Tractors
Allis-Chalmers Mfg. Co.

Tractors (Electric)
Link-Belt Co.

Trailers
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.

Free Service to Subscribers

RESEARCH SERVICE DEPARTMENT
Rock Products and Cement and Engineering News
205 W. Wacker Drive, Chicago, Ill.

Please send me catalogs and prices concerning the items checked below:

- ....Hoists for Concrete Buckets.
- ....Hose, Air Drill.
- ....Hose, Pneumatic Tool.
- ....Hose, Steam.
- ....Hose, Water.
- ....Hydrated Lime.
- ....Hydraulic Dredges.
- ....Industrial Railways.
- ....Instruments, Builders.
- ....Instruments, Testing.
- ....Joist Machines.
- ....Laboratory Equipment.
- ....Laundry Tub Molds.
- ....Letters and Figures.
- ....Lights, Carbide.
- ....Lights, Roof and Sidewalk.
- ....Lime Kilns.
- ....Lime Hydrators.
- ....Loaders, Car, Truck and Wagon.
- ....Locomotive Cranes.
- ....Locomotives.
- ....Machine Shop Equipment.
- ....Magnetic Separators.
- ....Measuring and Weighing Devices.
- ....Metal Lumber.
- ....Mills, Color.
- ....Mixers.
- ....Mixers, Batch.
- ....Mixers, Color.
- ....Mixers, Continuous.
- ....Mixers, Delivery.
- ....Mixers, Mortar and Plaster.
- ....Mixers, Ready-Mix Concrete Bodies.
- ....Monolithic Silo Forms.
- ....Motors.
- ....Motor Truck Dump Bodies.
- ....Molds (Building Tile, Block, Burial Vault, Etc.).
- ....Name Plates.
- ....Name Stamps.
- ....Oil Storage.
- ....Oils and Lubricants.
- ....Ornamental Molds.
- ....Packing, Hydraulic.
- ....Packing, Piston.
- ....Packing, Sheet.
- ....Packing, Superheat.
- ....Paints and Coatings.
- ....Pallet Facing Machines.
- ....Pallets, Steel or Wood.
- ....Perforated Metals.
- ....Pipe Iron.
- ....Pipe, Machines.
- ....Pipe (Concrete) Machines.
- ....Pipe Molds.
- ....Pneumatic Tools.
- ....Posts, Fence Molds and Machines.
- ....Posts and Standards, Ornamental and Lighting.
- ....Power Transmitting Equipment.
- ....Processes.
- ....Pulleys.
- ....Pulverizers.
- ....Pumps.
- ....Pyrometers.
- ....Rails.
- ....Reinforcement, Expanded Metal.
- ....Reinforcement Metal Fabric.
- ....Reinforcement, Metal Lath.
- ....Reinforcement, Special.
- ....Reinforcement Welders.
- ....Respirators.
- ....Rock Drills.
- ....Roofing Tile Machines.
- ....Rope Drive.
- ....Rope, Manila.
- ....Rope, Wire.
- ....Rubbing Beds.
- ....Safety Clothing, Etc.
- ....Sand-Lime Brick Machinery.
- ....Sand Testers.
- ....Sand Washers.
- ....Sand Washing Boxes.
- ....Saw Rigs.
- ....Scales.
- ....Scrapers.
- ....Screening Equipment.
- ....Screening Plants.
- ....Screens.
- ....Septic Tank Molds.
- ....Sheaves.
- ....Sidewalk and Curb Forms.
- ....Silo Doors, Hardware and Scaffolds.
- ....Silo Forms, Monolithic.
- ....Silo Roofs.
- ....Silo Stave Machines and Molds.
- ....Smokestacks.
- ....Spraying Equipment.
- ....Stampings, Metal.
- ....Stamps, Name.
- ....Steam Shovels.
- ....Steel, High Speed.
- ....Steel, Manganese.
- ....Stokers, Automatic.
- ....Stone Backing.
- ....Storage Bins.
- ....Strippers.
- ....Stucco.
- ....Stucco Machines.
- ....Sun Dials.
- ....Surfacing Machinery.
- ....Tampers, Automatic.
- ....Tanks, Elevated and Storage.
- ....Tanks, Steel.
- ....Tanks, Wood.
- ....Testing Equipment.
- ....Thermometers, Recording.
- ....Ties, Wall.
- ....Tile Machines, Building.
- ....Tile Machines, Drain.
- ....Tile Machines, Roofing.
- ....Tools, Finishing.
- ....Tracks.
- ....Track Material.
- ....Transformers, Electric.
- ....Trimstone Molds.
- ....Trucks, Hand and Lift.
- ....Trucks, Power.
- ....Unloaders.
- ....Valves.
- ....Vibrators.
- ....Wall Forms and Machines.
- ....Washing Equipment.
- ....Waterproofing and Dampproofing
- ....Weighing Equipment.
- ....Welding, Electric.
- ....Welding, Oxy-Acetylene.
- ....Well Curbing Machines and Molds.
- ....Wheelbarrows.
- ....Winches.
- ....Wrenches.

Firm Name _____

Individual _____ *Title* _____

Address _____

City _____ *State* _____

Classified Directory—*Continued*

Transmission Machinery
Allis-Chalmers Mfg. Co.
Huron Industries, Inc.
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Trucks (Agitator)
Blaw-Knox Co.

Trucks (Dump)
Ford Motor Co.

Truck Bodies (Dump)
Commercial Shearing & Stamping Co.
Dempster Bros.
Ford Motor Co.

Trucks (Hand)
Standard Pressed Steel Co.

Trucks (Lift)
Besser Mfg. Co.
Stearns Mfg. Co.

Truck Skids (Lift)
Besser Mfg. Co.

Trucks (Mixers)
Blaw-Knox Co.
Jaeger Machine Co.
Smidth, F. L., & Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Turbines
Allis-Chalmers Mfg. Co.
General Electric Co.

Unloaders
Barber-Greene Co.
Bucyrus-Erie Co.
Fuller Company
Haiss, Geo., Mfg. Co.
Link-Belt Co.
Marion Steam Shovel Co.
New Holland Machine Co.
Northwest Engineering Co.
Robins Conveying Belt Co.

Unloaders (Boat)
Link-Belt Co.

Unloaders (Box Car)
Barber-Greene Co.
Besser Mfg. Co.
Fuller Co.
Link-Belt Co.
Stearns Mfg. Co.

Unloaders (Pneumatic)
Fuller Company

Unloaders (Underground)
Nordberg Mfg. Co.

Ventilating Apparatus
Blaw-Knox Co.

Vibrators
Link-Belt Co.
Stearns Mfg. Co.
W. S. Tyler Co.

Wagons (Dump)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Blaw-Knox Co.
Koehring Co.

Washers (Log)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Smith Engineering Works
Traylor Engr. & Mfg. Co.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Bacon, Earle C., Co.
Eagle Iron Works
Haiss, Geo., Mfg. Co.
Hendrick Mfg. Co.
Lewistown Foundry & Mach. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Smidth, F. L., & Co.
Smith Engineering Wks.
Tyler, W. S., Co.
Traylor Engr. & Mfg. Co.
Universal Crusher Co.
Universal Vibrating Screen Co.

Weighing Equipment
Blaw-Knox Co.
Fuller Company
Heltzel Steel Form & Iron Co.
Jaeger Machine Co.

Welding and Cutting Apparatus
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
General Electric Co.
Roebling's, John A., Sons Co.

Welding Electrodes
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)

Welding Rods
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Bradley Pulv. Co.
Roebling's, John A., Sons, Co.
Ryerson, Jos. T., & Son, Inc.

Welding Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Roebling's, John A., Sons, Co.

Wheel or Gear Pullers
Armstrong-Bray & Co.

Winches
Link-Belt Co.
Robins Conveying Belt Co.

Wire Cloth
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Bacon, Earle C., Co.
Cleveland Wire Cloth & Mfg. Co.
Eagle Iron Works
Leschen, A., & Sons Rope Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.
Pioneer Engineering Wks., Inc.
Robins Conveying Belt Co.
Roebling's, John A., Sons Co.
Screen Equipment Co.
Tyler, W. S., Co.
Universal Vibrating Screen Co.

Wire (Copper, Iron and Steel)
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
General Electric Co.
Hercules Powder Co.
Roebling's, John A., Sons Co.

Wire (Electric)
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
General Electric Co.
Roebling's, John A., Sons, Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co. (Yellow Strand)
A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Clips
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co.
Leschen, A., & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Fittings
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co. (Yellow Strand)
A. Leschen & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Hooks
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Leschen, A., & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Lubricants
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co.
Roebling's, John A., Sons Co.
Texas Co.

Wire Rope Slings
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Broderick & Bascom Rope Co.
Leschen, A., & Sons Rope Co.
Roebling's, John A., Sons Co.

Wire Rope Sockets
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsi.)
Leschen, A., & Sons Rope Co.
Roebling's, John A., Sons Co.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT
Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED—Displayed or undisplayed. Rate per column inch, $5.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

USED EQUIPMENT FOR SALE

CONSOLIDATED GOOD USED EQUIPMENT

24" x 36" JAW CRUSHERS
1—Allis-Chalmers
1—Farrel
Also 1—42"x60" Farrel

DIRECT HEAT ROTARY DRYERS
1—5'x60' Traylor Eng.
3—5'x30', 80"x40' Ruggles-Coles.
1—6'x40' Bonnot.
Priced for quick sale and removal.

1—5-roll Raymond High Side Pulverizer, also all sizes Raymond beater types and Imp mills. Also other makes and sizes.

1—600 CFM Air Compressor, I-R., with 100 H.P., 2/60/440 volt motor.

3—Single Roll Crushers; 18x16" Pennsylvania, 18x24" McLanahan, 24x24" Link-Belt.

5—Centrifugal Air Separators; 14', 8', 30" Gayco; 10' Sturtevant.

3—42"x16" Allis-Chalmers Type "B" Crushing Rolls.

2—3'x8' Niagara and 4'x8' Allis-Chalmers Vib. Screens, 2-deck, motor driven.

Just a partial list

WE WILL BUY A SINGLE MACHINE OR COMPLETE PLANT

What do you wish to sell? Send us details.

CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row **New York, N. Y.**

Plant and Shops at Newark, N. J., cover 8 acres of ground.

SAVE

Bolted type steel bins will cost you less erected than ordinary wood bins.

New and Used Pipe and Tubing

Jos. Greenspon's Son Pipe Corp.
Natl. Stock Yds (St. Clair Co.) Ill.

CRUSHERS

GYRATORY: 42" McCully with 80% brand new parts. 21-K Gates (42"). 36" Superior McCully like new. 20" Superior McCully reduced to 16". Telsmith Nos. 4, 5, 6 & 9. Gates Nos. 10, 9, 8, 7½, 6, 5, 4 & 3. Also Austins, Kennedys and Traylors.
JAW TYPE: Traylor 84x66, 60x48, 30x60 & 24x72. Buchanan 32x72 & 30x42. Farrel 24x36 & 30x36. P&M 24x36. Good Roads 1630 & 1040. Bakstad 3-jaw 8x20. Misc. 9x16, 8x36, 15x36, Etc.
REDUC. TYPE: 6, 10 & 18" Super. McCulley. 2', 3' & 4' Symons Cone. 7" Newhouse, etc.
ROLLS: Allis-C. 36x16, 40x15 & 54x24. Jeff. 30x30.
HAMMERMILLS: Williams Nos. 3, 4, 5 & 9. Others.
MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Kent 34x7". 48" Fuller-Lehigh. 5'x22' Bonnot and others.

MISCELLANEOUS ITEMS

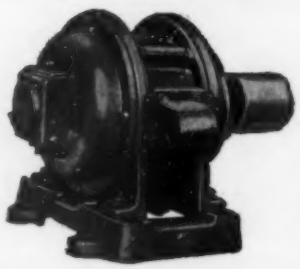
Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryers, Derricks, Draglines, Dredges, Drills, Engines, Excavators, Elevators, Generators, Hoists, Kilns, Loaders, Locomotives, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, and many other items located throughout the United States at Bargain Prices.

ALEXANDER T. McLEOD
7229 ROGERS AVENUE **CHICAGO**

GREGORY "HI-GRADE-REBUILT" Electric Motor and Machy. Bargains

● MONEY BACK GUARANTEE ●

A C MOTORS
D C MOTORS
MOTOR-GENERATOR SETS
ARC WELDERS



METERS
TRANSFORMERS
AIR COMPRESSORS
CENTRIFUGAL PUMPS

SAVE MONEY **Send Us Your Inquiries** **Write—Phone—Wire**

GREGORY ELECTRIC CO. (Est. 1893)
1601-A SO. WOLCOTT AVE. **CHICAGO**
(formerly Lincoln St.) **Phone—Canal 1690**

1500' Conveyor Belt 30" wide 7 ply.
Belt Conveyors 36"x150' & 20"x275'.
Conveyor Equipment 14", 16", 24", 30" & 36".
18" & 30" Robins Belt Trippers.
Portable Belt Conveyor 16"x25'.
Link-Belt Bag Conveyor 30"x32'.
L-B Encased Bucket Elevator 10"x35'.
L-B Vertical Bucket Elevator 10"x75'.
Jeffrey Vert. Bucket Elevator 14"x20'.
Continuous Inclined Elevator 14"x47'.
Haiss Digging Loader On Wheels.
10 Elect. Centrif. Pumps, 165-1000 gals.
Schramm 15-hp. Electric Compressor Unit.
Hummer 8'x7' Vibr. 1-deck Screten, V-40.
Hummer 3'x5' & 4'x5' Vib. 2-deck Screen.
Universal 3'x8' Vibr. 1-deck Screen.
Kennedy 378 Gearless Crusher, 50-hp. motor.
B-K Dreadnaught ⅝-yd. Digging Bucket.
Hayward Type E Clamshell 2-yd. Bucket.
Hayward type E Clamshell ½-yd. Bucket.
45' Crane Boom for Koehring No. 301.

G. A. UNVERZAGT
15 PARK ROW, NEW YORK CITY

FOR SALE

25 Ton Steam Davenport Locomotive.
50 H.P. Electric Centrifugal Pump.
2 Complete Telsmith Roller Bearing Revolving Screens, 48" x 21' 6".

COOGAN GRAVEL COMPANY
Lehman Building **Peoria, Illinois**

New—RAILS—Relaying

ALL SECTIONS

Also contractors' equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locos, frogs and switches. Attractive prices quoted, wire, write or telephone for quotations.

M. K. FRANK
480 Lexington Ave., New York, N. Y. 25 St. Nicholas Building, Pittsburgh, Pennsylvania

2, 3, 4 & 5½ Symons Cone Crushers.
No. 6, 10 & 18 Superior McCully Gyr. Crushers.
8x12" to 66x84" Jaw Crushers.
Steam, Gasoline & Elec. Shovels—¾ to 8 yd.
33, 40 & 50 ton Saddle Tank std. ga. Locomotives.
Std. ga. Loco. Cranes—also Gas. Cat.
50—Koppel 2 yd. 36" ga. all steel quarry cars.
Diesel Engines 50 to 750 HP.
Derricks, Compressors, Conveyors, Rotary Dryers.
Screens, Bins, Motors, Generators, Gravel Plants.
Let us have your inquiries. Ask for bulletin No. 38.

MID-CONTINENT EQUIPMENT CO.
710 EASTGATE **Pa. 2290** **ST. LOUIS, MO.**

Reduction Crushers-10"-7" Newhouse; 6"8" Sup.-Mc. Jaw Crushers-24x36-18x24-9x36-5x36-10x20 port. plant. Vibrating Screens-2x7-3x6-2½x5-3x8-4x10-2&3 deck. Crane-Dragline, ⅝ yd., 3 ton cap., full revolving. Cranes-Drags., L-B-Lima-Lorain-P&H-1¼-1 yd. Sauerman Scraper Outfits-½-⅝-1-1½-2-2½-4-5 yds., 75 HP Kern Hoist. Misc. hoists-buckets-slacklines. Gas Locos.-16&12 ton 36" gage; 8 ton std. gage. BUCKETS — Drag Scraper-Slackline-Dragline-Clamshell; ½ to 8 yds. Orange peel 220" to 5 yd.

JAMES WOOD, 53 W. Jackson Blvd., Chicago, Ill.

FOR SALE
COMPLETE PLANT FOR HYDRATING LIME

Address: Box 835, care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

Take advantage of the Opportunity offered in the Used Equipment Department to dispose of the equipment that you no longer need.

"E. C. A. Rebuilt" Quarry and Gravel Plant Equipment

AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 21 cu. ft. to 1,000 cu. ft.

BINS

2—3 compartment with scales, 10,000 lbs. cap.; 1—150 ton Blaw Knox; 1—112 ton Butler.

10—2 compartment: 4—118 ton Blaw Knox; 1—87 ton Blaw Knox; 1—54 yd. Johnston; 1—60 ton Butler; 2—35 ton Blaw Knox; 1—26 ton Heltzel. With or without weigh batchers.

1—1,200 bbl. Blaw Knox round bulk cement bin with 2,000 lbs. weigh batcher.

BUCKETS

1—4 yd. Hayward class G clamshell.

35—Williams, Blaw Knox & Owen clamshell—all sizes & types.

5—Page dragline: 2—1½ yd.; 2—1¼ yd.; 1—1 yd.

6—Dragscraper: 3—1 yd. Green & Cedar Rapids; 1—¾ yd. Sauerman; 2—½ yd. Green.

CRANES (Locomotive)

2—Browning 25 ton cranes, ser. Nos. 1854 & 2060, 8 wheel, std. ga., 50' boom.

CRANES & DRAGLINES

1—Link-Belt K-55, ser. No. 1698, 70' boom, 2 yd. bucket, also have 2 yd. shovel attachment.

2—Northwest, model 104, ser. nos. 2079 & 1597, 45' boom, 1¼ yd. bucket; one with 1 yd. shovel attachment.

1—Link-Belt mod. K-42, ser. No. 1265, 45' boom, 1¼ yd. bucket; also have 1 yd. trench hoe attachment or 1¼ yd. shovel front.

1—Northwest mod. 105, ser. No. 2053, 40' boom, 1 yd. bucket.

1—American Gopher No. GS-134, 50' boom, 1 yd. bucket.

1—Link-Belt mod. K-1, ser No. 1024, 50' boom, 1 yd. bucket.

1—Osgood Heavy Duty, ser. No. 2009, 40' boom, 1 yd. bucket & with 1 yd. shovel attachment.

1—Bucyrus-Erie mod. 1030, ser. No. 10512, 45' boom & ¾ yd. shovel front.

1—Brownhoist No. 1, ser. No. 10057, 30' boom, ⅛ yd. shovel front.

1—Byers Bearcat mod. 27, ser. No. 5289, 30' boom, ⅜ circle swing, ⅜ yd. bucket.

1—Erie type B-2, ser. No. 4122, steam crane, 40' boom, 1 yd. bucket.

CRUSHERS

3—Gyratory: 1—Allis Chalmers Gates No. 5; 1—McCully No. 3; 1—McCully No. 0.

3—Jaw Crushers; 1—12x26" Champion No. 6; 1—10x20" Climax No. 2½; 1—9x16" Telsmith No. 9-A.

1—Set of Allis Chalmers smooth type crushing rolls, size 42x16".

DERRICKS

4—Steel stiff leg: 1—15 ton Dobbie, 100' boom; 1—15 ton Clyde, 50' boom; 1—15 ton Clyde "A" frame barge derrick, 50' boom; 1—10 ton Insley, 80' boom.

DRILLS

6—Wagon drills, Ingersoll Rand & Gardner Denver, with IRX71 & GD17 and 21 drills.

LOADERS

3—Bucket loaders: 2—Barber Greene (1—mod. 42-B, No. 42-12-59; 1—mod. 42-A, No. 23431); 1—Haiss No. C-7042.

PUMPS

5—Dredge pumps: 1—10" Morris manganese; 1—8" Cataract No. 175805; 1—8" Morris; 1—6" Erie; 1—6" Fairbanks Morse Woods trash pump.

TRACTORS

3—Allis Chalmers mod. "L" tractors, Nos. 682, 1670 & 1691, with Baker hydraulic bulldozers.

4—Caterpillar: 1—mod. 65, ser. No. 2-D-201; 2—mod. 60, ser. Nos. 5842 & 5874; 1—mod. 20, ser. No. 7969.

WHIRLEY

1—Mod. 75 Wiley Whirley No. 2973, 20 tons cap., 75' boom, 8D Clyde, 80 HP. elec. hoist & 30 HP elec. swinger, all complete. Perfect condition.

SEND FOR COMPLETE NEW STOCK LIST.

EQUIPMENT CORPORATION OF AMERICA

PHILADELPHIA — P. O. Box 5471, Kingessing Sta. — Phone Granite 7600
CHICAGO — 1119 S. Washtenaw Ave. — Phone Nevada 2405
PITTSBURGH — P. O. Box 933 — Phone Federal 2080

SPECIAL ELECTRIC MOTORS

Immediate Shipment—Quality Guaranteed

12	— 75 HP	—	875 RPM
2	— 100 HP	—	875 RPM
2	— 125 HP	—	3600 RPM
2	— 150 HP	—	1800 RPM
1	— 200 HP	—	1760 RPM
1	— 200 HP	—	1800 RPM
2	— 200 HP	—	1175 RPM
5	— 250 HP	—	1800 RPM

All 3 phase — 60 Cycles
440 Volts — General Electric
Located in Southwest

3—500 KW 25 Cycle 600 Volt Rotary Converter
2—33000 Volt Electrolytic Lightning Arrestor
5—300 KW 25 Cycle Rotary Converters Complete
Located in Mid-west

RAILS

Complete stocks carried at principal points throughout the country

HYMAN-MICHAELS COMPANY

120 So. Michigan Ave. Chicago, Ill.
St. Louis — New York — San Francisco — Seattle

SPECIALS

1—90" x 50' Ruggles Coles Class XA14 Dryer. "Almost New". Complete.

1—375 H.P. Westinghouse Type H.F. Motor, 3 Phs. 60 Cyc. 440 Volt. 580 R.P.M. "Excellent Condition".

4—No. 60 & 4 No. 80 Bailey Feeders.

1—Myer-Whaley No. 4—Shovel.

2—6" Type "E" Fuller Kinyon Pumps (Complete).

ALSO:

"COMPLETE ROCK CRUSHING PLANT:"

1—Allis Chalmers-8K-Ser. 6256 Gyratory Crusher, with 150 H.P. Motor. 3 Phs. 60 Cycl. 220 Volt.

1—Allis Chalmers 5K Ser. 7171 Gyratory Crusher.

1—Ingersoll Rand Compressor 575' Imperial Type XRB, 2 stage, belted to 105 H.P. Gen. Elec. Motor, 3 Phs. 60 Cyc. 2300 Volt, with Air Receiver & Unloader Complete.

For sale as whole or in part at bargain prices. Also Dryers, Crushers, Pumps, Cars, M. G. Sets, etc.

Write, wire, or call us for complete list.

FREESE EQUIPMENT SERVICE

1529 E. 63th Place, Chicago, Ill.
Tel. Dorchester 0162

REBUILT—FOR RENT—SALE

2—C.P. 105—2 stage, air cooled, Portable Compressors "Demonstrator" Models.
2—I.R. No. FM-2 Wagon Drills—(Like New).
2—C.P. No. 100 Wagon Drills—(Like New).
1—4 to 6 yd. Blaw-Knox Mixer Agitator.
1—International TD-40 Diesel Tractor—Comb. Bulldozer & Angle Blades.
6—A.C. "35" Cat. "30" & "60" Tractors & Bulldozers.
22—120', 220', 360' Port. Compressors.
1—Link Belt 25 ft. x 24" Belt Conveyor.
4—16" Trough type Port. Belt Conveyors x 25 ft. long.
2—I.R. Model 33 Drill Sharpeners.
3—2 & 3 drum—65—80 H.P. Elec. or Gas Derrick Hoists with Swingers.
2—Steam Hoists—3 drum—8½" x 10" and 9" x 12" with or W/O A.S.M.E. boilers.
15—⅝ to ½ Yd. Clamshell Buckets.
1—½ Yd. Full Revolv. Comb. Crane & Shovel.
1—⅜ yd. Byers "40" Comb. Backhoe & Crane.
5—Northwest, Osgood, Browning, Byers, P&H ½ to 1¼ yd. Cranes & Shovels.
28—2", 3", 4", 6", 10" Gas & Elec. Self Prime Cent. Pumps.
1—B-K—72 ton—2 compartment Bin & Batchers.
1—Shovel & Backhoe attachment to fit ¾ yd Bay City Tractor Shovel.

Write for Latest Complete List Just Off Press
All Equipment Located at Our Yard

RENTAL SERVICE CO., INC.

20th & Venango Sts. Philadelphia, Pa.

Derrick, all steel, stiff legs, 82' boom with Lambert Hoist & Swinger, A.C. $2,500
Haiss 1-yd. Hayward 1⅝ Clamshell, ea. 250
Concrete mixers (2) 2-yd. Rollerbear, ea. 1,000
Worthington Crushing Rolls, 16x36 850
Geared Double Rolls 200
7 Motors, 220-3-60 from 3-50 HP.; 2 power units, gas, 50-75 HP.; 60' bucket elevator, 12" buckets; ball bear. idlers; steel cars (100) roller bear.; located near NY City.

Address Box No. 815, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

1—6½ yd. Bucyrus Elec. Shovel 320B-90' boom.
1—30 ton Browning Crane, 60' boom.
1—1 yd. Koehring Crawler Gas Crane.
1—10" AMSCo Full Manganese Pump.
5—Sullivan Air Rock Drills.
3—Mine Hoists, Electric and Steam.
5—Locos., Std. and 36" Ga.
60—Dump Cars, 5-12 and 20 yd. Std. & 36" Ga.

Steel Buildings, various sizes.

IRON & STEEL PRODUCTS, INC.

Chicago (Hegewisch Sta.), Ill.
"Anything containing IRON or STEEL"

SLIPRING MOTORS 3 PH. 60 CY.

4—700 HP 2200 v. 393 Rev. Gen. Elect.
4—500 HP 2200 v. 435 Rev. Westg.
1—200 HP 440/220 v. 500 Rev. Westg.
1—200 HP 2200 v. 580 Rev. Westg.
1—200 HP 440/220 v. 585 Rev. Gen. Elect.
1—150 HP 2200/440/220 v. 500 Rev. Westg.

DIESEL POWER PLANT

1—125 KW 250 or 125 v. DC Generator dir. con. to Buckeye Full Diesel Eng.

Duquesne Electric & Mfg. Co.

PITTSBURGH, PA.

STORAGE BINS

1—231 cu. yds. circular steel bin, 20' dia.
1—Blaw-Knox 2 compts. 72 tons, volume batchers.
1—Butler 51 tons, 2 compts. weigh batchers.
2—Fuller 135 bbls. bulk cement, electric weigh batchers.

CONCRETE PLANTS

1—Butler 65X 3 compts. aggregate bin, bulk cement compt. weigh batchers. This unit new, never used.
1—Butler 100X 2 compts. aggregate bin, bulk cement bin, weigh batchers, screw conveyors.
Other complete plants 105 yds. and larger.

CRUSHERS

Jaw—6x12, 9x15, 9x16, 18x36, 24x36.
Gyratory—No. 5 McCully—No. 37 Kennedy-Van Saun.

CONVEYOR EQUIPMENT

Troughing rollers and return idlers, 16", 18", 20", 24", 30" and 36".
Conveyor belt, 18", 20", 24", 30" 36".
Head and tail pulleys with take ups in any size.
1—Bucket elevator 8"x16"x12" centers 32".
Nelson portable bucket loader—cat.—gas.

CRANES — SHOVELS

1—P&H Model 400 crane ¾ yd.
1—Northwest Model 105 combination crane-shovel ¾ yd.
1—Lima 1¼ yd. combination crane and shovel.
1—Northwest Model 104 combination crane and shovel, 1 yd.
1—Osgood steam shovel, 1¼ yd.
1—Browning truckcrane.

LOCOMOTIVES

4—36" gauge, 20 tons—gas—Whitcomb and Vulcan.
1—36" gauge, 14 tons—gas—Whitcomb.
1—36" gauge, 4½ tons—gas—Vulcan.

PUMPS

1—8" Gould, sand, belt drive.
1—8" AMSCO dredge Type M—150 HP. motor drive.
15—Steam Horizontal Duplex—all sizes.

RICHARD P. WALSH CO.

30 CHURCH STREET, NEW YORK

JAW CRUSHERS

10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 30x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42 and 84x66.

CONE & GYRATORY CRUSHERS

18 in., 24 in., 30 in., and 36 in. Symons Disc.
4-10 TX Traylor 4 ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
2—Traylor T-12 Bulldog Gyratory.
No. 6 BH Traylor Fine Reduction.
17 Gates K—Nos. 3, 4, 5, 6, 7½, 8 & 9½.

CLAM SHELL BUCKETS

¾ yd. cap. Williams Hercules Digger.
¾ yd cap. Hayward Material Handling.
6 Blaw-Knox & Owen 1 to 2 yd. cap.

CONVEYOR BELT & PARTS

Belt: 1500 ft. 36", 1700 ft. 30", 600 ft. 24", 360 ft. 20", 230 ft. 18", 340 ft. 16".
Idlers & Drives for 18, 24, 30 & 36".

DRILLS

4—Sanderson 14 & Loomis 44.

MISCELLANEOUS

Air Compressors: 310, 528, 676 & 1300 ft. & 2600 ft.
Gas Locomotives: (13) from 3 to 16 tons.
Derricks: (6) Stiff Leg & Guy Type.
Sauerman Outfits: ½ yd., 1 yd., & 1½ yd.
Rotary Dryers: 8'0"x54 ft., 6'0"x50 ft., 5'3"x69 ft., 4'0"x30 ft., 2'6"x24 ft., 3'0"x20 ft.
125 ton Fairbanks R.R. Scale—50 ft.
5'x12' Rod Mill & 30" Griffin Mill.
8'x6' KVB & 5'x22" Hardinge Ball Mill.
No. 0000 Raymond Mill & Separator.
125 HP Erie Economic Boiler.
3 Ton 48' Span O.E.T. Shop Crane.

R. C. STANHOPE, INC.

875 Sixth Ave. New York, N. Y.

CLASSIFIED ADVERTISEMENTS—*Used Equipment for Sale*

LOCOMOTIVES: 35 ton, standard gauge, steam, built 1923, A.S.M.E. boiler. Heisler 45 ton, standard gauge, steam, New condition.

LOCOMOTIVE CRANE: Browning 25 ton, steam, standard gauge, late type.

HOIST: Single drum Mine type, drum 50" dia. with 100 or 150 H.P. slip ring motor, condition like new.

MINE HOIST: 500 H.P., two drums, rope capacity 869 ft. 1½" rope, 29,800 lbs. unbalanced, with 500 H.P., 2200 volt Motor, New condition.

TRACK SHIFTER: Nordberg type N, standard gauge, perfect condition.

BELT CONVEYOR: 36" x 204 ft. centers, heavy duty belt.

COMPRESSOR: Ingersoll Rand ER1, capacity 640 cu. ft., with 80 H.P. motor, short belt drive.

1—Synchronous direct motor drive, 2 stage, capacity 3480 cu. ft., 625 H.P. Also, one 1722 ft., 300 H.P., 100 lbs., 2200 volt, both complete, perfect condition.

DRILL SHARPENER: Ingersoll Rand IR50, high lift type for 7" well drill bits.

REDUCTION CRUSHERS: Telsmith Gyratory 4" opening and 10 x 30 Good Roads Jaw Crusher.

ROCK GRAB: Bucyrus Erie 5 ton.

BYERS ½ yd. half circle swing, crawler tread with skimmer scoop Shovel, Back Hoe and Crane boom.

CARS: 10—10 yd., 36" gauge, all steel, Western, two way air dump and air brakes. 6—4 yd., 36" gauge, all steel, automatic dump. 20—6 yd., standard gauge, 2-way dump, Koppel Cars, steel underframe, MCB couplers.

DIESEL OIL ENGINE: 450 H.P., thoroughly modern, late type with 300 KW, A.C. Generator and auxiliary equipment.

SCREEN: Telsmith Vibrator 4 x 12, single deck, with motor and V-belt drive.

DREDGE: Portable 6", all steel, gas engine powered.

JAW and GYRATORY CRUSHERS all sizes and types.

A. J. O'NEILL

Lansdowne Theatre Building, Lansdowne, Pa.

Phones: Philadelphia, Madison 7578-7579

FOR SALE OR FOR RENT

2—9B3 and 1 No. 7 **McKiernan-Terry Steam Hammers.**
1—3-Drum **Thomas Elec. Hoist** with boom swinger.
1—75-B, 1¼-yd. **Gas Shovel** with dragline attachment, 55' boom, 1-yd. bucket.
1—Model 75 Northwest 2-yd. Shovel, 2 yrs. old with oil engine.
1—50-B **Bucyrus Diesel Dragline.**
1—50-B **Bucyrus Steam Shovel, or Dragline.**
2—Vulcan, 16-ton gasoline locomotives.
7—21-ton, 11x16, Std. Ga. **Davenport & Vulcan Locos.**
2—25-ton, 12x16, Std. Ga. **Davenport Locs.**
1—28-ton, 12x18, Std. Ga. **Vulcan Steam Locs.**
2—38-ton, 14x22, Std. Ga. **American Steam Locs.**
4—50-ton, 17x24, **Davenport, 6-wheel Switchers.**
1—No. 8-C **Browning Steam Locomotive Cranes** 12-yd., 16-yd., 20 yd., 30-yd. standard gauge
Dump Cars
General Construction Equipment

CLAPP, RILEY & HALL EQUIPMENT CO.

14 North Clinton St., Chicago, Illinois

LOCOMOTIVES

100 ton American Consolidation type 2-8-0, 23x28" cylinders.

85 ton Baldwin 8-wheel switcher, type 0-8-0, with separate tender, 21x28" cylinders.

72 ton American 6-wheel switching locomotive, 0-6-0, with separate tender, 20x26" cylinders.

60 ton Baldwin 6-wheel switching locomotive, type 0-6-0, with separate tender, 19x26" cylinders.

55 ton Baldwin 6-wheel switching locomotive, type 0-6-0, with separate tender, 18x24" cylinders.

50 ton Baldwin 6-wheel switching locomotive, type 0-6-0, with separate tender, 17x24" cylinders.

40 ton Baldwin 4-wheel switching locomotive, 0-4-0, with separate tender, 15x24" cylinders.

Complete stock list on request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY

BIRMINGHAM, ALABAMA

FOR SALE

1—P & H 400 ¾ yd. Rebuilt gasoline comb. shovel and crane.
1—Byers 80 ¾ yd. gas. crane, New 1936.
1—Byers 125—1½ yd. gasoline Dragline, New 1936.
1—Marion Elec. Dragline Model 37, 50' boom, 1½ yd. bucket—ex. condition.
1—37 Kennedy Van Saun gyratory crusher with V belt drive and motor.
1—8 inch McCulley gyratory crusher.
1—Three Drum American Hoist.
1—Sauerman Slackline elec. Hoist with 150 hp. motor.
1—12 inch Amsco dredge pump 250 hp. motor direct connected.

Elwood Sales & Manufacturing Co.

WALLACE BLDG. LAFAYETTE, IND.

---

4 ft. Symons Coarse Cone Crusher.
30x60" Traylor Steel Jaw Crusher.
36" Superior McCully gyratory. Like new.
12-N Allis Chalmers Gyratory. Never used.
16" Superior McCully, manganese fitted.
No. 9 Telsmith primary, new 1928. Used 1 yr.
Raymond IMP Pulverizer, new 1932, used 1 mo.
240 HP F-M full Diesel 200 KVA 3/60/220-2400V.
240 HP Fairbanks Morse VA diesel with clutch.
120 HP Fairbanks Morse Model 32 full diesel.
30 ton Plymouth std. ga. gasoline Locomotive.
20 ton Whitcomb std. ga. gasoline Locomotive.
40 ton Baldwin saddle tank Loco. ASME. Rebuilt.
12 ton Whitcomb 36" ga. gas Locomotives.
25 ton American 8 wheel Loco. Crane. 1929.
No. 3 Northwest gas Shovel & Dragline. Rebuilt.
Koppel 2 yd. 24" ga. V-dump cars. Roller brg.
310 ft. Chic. Pneu. compressor. Gaso. power.
6" Jaeger portable centri. pump. Gas engine
120 ton Fairbanks 50 ft. Railroad track scale.
Barber Greene belt conveyors 24" x 130 & 170 ft.

MISSISSIPPI VALLEY EQUIPMENT CO.

515 LOCUST ST. ST. LOUIS, MO.

"Try us whenever Buying or Selling"

DIESEL ENGINES

MOTORS — GENERATORS
AIR COMPRESSORS — PUMPS

IMMEDIATELY AVAILABLE FROM STOCK

A. G. Schoonmaker Corporation

42 Hudson St., Phone Bergen 4-5300, Jersey City, N. J.

PRICED FOR QUICK SALE

1—6' x 50' Ruggles-Cole Rotary Dryer.
1—Tyler 3' x 5' Screen.
1—18" x 24" double roll Crusher.
3—Raymond Mills, No. 1, No. 00.
1—Barber Greene Loader.
4—Link Belt 60" Dehydrating Cones.
2—3 ton Plymouth, model TLF Gasoline Locomotives.

BRILL EQUIPMENT CORP.

183 VARICK STREET, NEW YORK, N. Y.

ELECTRICAL MACHINERY

Motors and Generators. A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

3-hp. FBM. Gasoline	$ 35.00
10-hp. Full Diesel Oil Engine	150.00
15-hp. FBM. Oil Engine	200.00
20-hp. Full Diesel Oil Engine	275.00
40-hp. Full Diesel Oil Engine	450.00
90-hp. 3-Cyld. Anderson Oil Engine	900.00
120-hp. Full Diesel Oil Engine	1200.00
2-Cyld. 6x6" Curtis Air Compressor	175.00
65 Kva 3/60/2300 V257 rpm. Generator	425.00

All sizes and makes Diesel Oil Engines from 20 to 1000-hp. Also Motors, Generators, Compressors, Quarry equipment.

J. D. ANDERSON MACHINERY COMPANY

3516 MAPLE AVE., ST. LOUIS, MO.

EVERYTHING FOR Quarry, Pit and Power Plant

Buy GOOD used Equipment — Save the difference.

ROSS POWER EQUIPMENT CO.

Indianapolis, Ind.

FOR SALE

7—4-yd. Western Dump Cars, 36" Gauge. Purchased New From Manufacturer and used only 3 months moving sand. Stored at our yard, Painesville, Ohio. Priced to sell. Loaded on cars or delivered by truck.

L. GAGE BOOTH
PAINESVILLE, OHIO

BARGAIN

1—Model (600-A) P & H 1 Yard Combination Crawler, Crane and Shovel, equipped with Waukesha JL-6x7 Motor, one yard bucket, 45' boom, full crawler, machine overhauled recently and ready for work. Offer subject to prior sale.

HUNTER TRACTOR & MACHINERY CO.
327 S. 16th St., Milwaukee, Wis.

CONCRETE BLOCK MACHINERY

Catch Basin & Manhole Block Machines will add a money making department to your concrete block, contractors or quarry interests.

Complete Block plant in Chicago territory for Sale.

H. W. LACKEY
858 East 39th Street Chicago, Illinois

FOR SALE—A GOOD TIME TO BUY

Crushers Gyr. McC. 42—Allis 36—7½—Tray. 5.
Crushers Jaw 24x36—50x42—Rolls 16x42.
Crushers Pulver. No. 4 Williams Jumbo.
Pebble Mill 8x22—Ball Mill 3x8 ft.
Mine Hoist Nordberg D/D electric 300 H.P.
Storage tanks vert. steel 12,000 gals.
Locos. S/G gas two 9 ton Vul. and Whit.
Gravel plant steel, complete, wet process.

A. V. KONSBERG
111 W. JACKSON BLVD., CHICAGO

FOR SALE

3—Std. No. 8, 25 ton BROWNING LOCOMOTIVE CRANES, 50 and 60 ft. booms.
3—PARSONS TRENCH EXCAVATORS, 2 Model 25, 1 Model 30.

T. STUART & SON COMPANY
70 Phillips Street
Watertown, Massachusetts

15—Buckets, Clamshell & Orange Peel, ½-2 yds.
17—Boilers, 50-150 H.P., Vert. and Horiz, A.S.M.E.
1—Hall-Scott Gas. Eng., 180 B.H.P.
6—Hoists, 2 drum and swinger, 37½ H.P. elec.
30—Compressors, 360'-1500', steam and elec. drives.
3—20 T. Browning 8 wheel Loco. cranes, M.C.B. boilers, 1 oil-fired.

COAST-TO-COAST EQUIP. CORP.

101 W. 31ST STREET NEW YORK, N. Y.

FOR SALE OR RENT

1—⅝ cu. yd. General Excavator Company crawler type gasoline shovel, with extra clam shell boom. First class condition.

MUSCLE SHOALS WHITE LIME COMPANY
Sheffield, Alabama

CLASSIFIED ADVERTISEMENTS

USED EQUIPMENT FOR SALE

FOR SALE
DREDGE BOAT

Eighteen by fifty-six by five feet six sectional steel hull dredge. Ten inch manganese steel pump.

MISSISSIPPI SAND & GRAVEL CO.
KOLOLA SPRINGS **MISSISSIPPI**

FOR SALE

One Laidlow-Dunn-Gordon Compressor, size 12"x18" and 12"x12" Serial 22293—Duplex Steam driven and compound air type horizontal compressor with cast iron base plate under whole assembly and air receiver 42"x8' and fittings.

Jaffee Cotton Products Mfg. Co.
P. O. Box 5184 **Dallas, Texas**

FOR SALE

One 6KW Wood Generator, 125 Volts, 48 Amp., Speed 1275.

Call or Write
CHANT KELLY
Phone 1K3 **Pound, Va.**

2—50 HP electric shaft hoists.
½ yd. Byers comb. shovel crane.
¾ yd. Osgood comb. shovel crane.
¾ yd. Northwest shovel.
1 yd. Northwest shovel.
Owen & Hayward ¾ & 1 yd. buckets.
Compressors: 446, 310, 136, 110 ft.
Sullivan and I-Rand jackhammers.

J. T. WALSH
Brisbane Bldg. **Buffalo, N. Y.**

RAILS—1 Ton or 1000

NEW RAILS—5000 tons—All Sections—All Sizes.
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—New—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money.
'Phone, Write or Wire.
L. B. FOSTER COMPANY, Inc.
PITTSBURGH **NEW YORK** **CHICAGO**

BUSINESS OPPORTUNITIES

WANTED

Party with machinery to operate limestone quarry in Central Illinois. **Address Box 832, care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.**

BUSINESS OPPORTUNITIES

FOR SALE OR LEASE

A virgin flint concrete sand and gravel field with little or no overhead burden, sizes 1½ inch down, sharp silica sand, both officially sampled, tested and approved as meeting specification requirements for concrete work, test wells, hills and valleys indicate around 3,000,000 tons in a single 40 acres of the tract of 120 acres, located two miles from U. S. No. 11 Highway, and three miles from Great Southern Railroad Station, between two cities, Laurel and Meridian, Miss., where gravel and sand retail at $3 a ton and up. Great demand for loose gravel and sand. It is trucked from pits into cities to the points where used. I want a partner to help me do things, or else I want to sell, or lease, the whole or a part interest. I offer a powerful bargain to the lucky man. Only dryscreening machinery needed in this field, or washing machinery. I positively cannot fill the present pitrun demands. This property is clear of all debt.

ROBERT L. McLENDON (Owner)
P. O. BOX 103 **VOSSBURG, MISS.**

OPPORTUNITY

For manufacturer of concrete building materials. 750,000 yards of high grade sand and gravel available. 30 miles from New York City. For particulars address Box 833, **Care of Rock Products, 205 W. Wacker Drive, Chicago.**

FOR SALE OR RENT

Small agricultural lime plant. 20 foot vein. Good opening. Crusher and pulverizer. Requires small capital.

BRANDON & BRANDON, ATTORNEYS
Butler, Pa.

POSITIONS WANTED

ASST. SUPERINTENDENT OR SHIFT Foreman position wanted by an American with good education; over fifteen years experience in operation of wet and dry cement plants including construction and machinery installation. Address Box 834, Care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

PLANT SUPERINTENDENT OR ENGINEERING Executive available on reasonable notice. Am American born, graduate engineer with over twenty years experience in the design, construction and operation of industrial plants, wet and dry cement plants, mines and quarries, handling labor on large scale production. Future opportunity more important than starting salary. Address Box 828, Care of Rock Products, 205 W. Wacker Drive, Chicago, Ill.

POSITIONS WANTED

PERMANENT POSITION DESIRED BY quarry superintendent with 18 years' experience in operating trap rock, limestone quarries and crushing plants; also familiar with lime kilns and construction work. Excellent references. Address Box 661, care of Rock Products, 205 W. Wacker Dr., Chicago, Illinois.

CONSULTING ENGINEERS

RAY E. CRAUMER
CONSULTING ENGINEER
Mining—Mechanical—Combustion
30 Years Experience in Operation and Design

Management	Air Conditioning	Kilns
Reports	Power Plants	Incinerators
Safety Work	Plant Layouts	Crematoria

1617 So. 16th Ave., Maywood, Ill.
Phone No. 2836

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

CONSULTING CHEMIST

Processes, research, development and literature of lime and similar products, waste material, etc.

E. W. ROTH
16 Burr Road **Maplewood, N. J.**

H. D. RUHM
Consulting Engineer
PHOSPHATE LANDS
all grades of rock.
PHOSPHATE FILLER

40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
805 West Seventh St., Columbia, Tennessee

H. J. BROWN
CONSULTING ENGINEER
35 Doane Street, **Boston, Massachusetts**

Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation	**Design**
Examinations	**Construction**
Reports	**Supervision**

INDEX OF ADVERTISERS

your best bet!

CALCIUM CHLORIDE STABILIZED MIXTURE

Utilizes
THE MATERIALS YOU HAVE ON HAND

The production of ready-mixed stabilized road material is the aggregate producer's best bet for added profits in 1938 and the years to come.

In awarding contracts for 185 miles of stabilized roads to be constructed this spring, the Michigan State Highway Department stipulated that all of the 232,709 cubic yards of stabilized material required must be *plant-mixed*. To fill their 1938 maintenance requirements, Michigan contracted for an additional 302,560 cubic yards of *plant-mixed* calcium chloride stabilized mixture. The demand for plant-mixed material is strong, too, in Illinois, Indiana, Minnesota, Ohio, and is increasing rapidly in other states.

Here's a market to your liking — a profitable market that you can cut into on short notice. Most pit and quarry owners have the greater part of necessary equipment on hand. Many have waste heaps of pit over-burden and washed-out sand, silt and clay-which they can turn back into profit by mixing in proper proportions with graded aggregates.

Your state, county, township and city officials will tell you they want ready-mixed calcium chloride stabilized road materials. Ask them. Then get into the business now, this spring, and reap the profitable rewards in supplying this road necessity. Any of the firms listed below will gladly furnish free information and advise you the easiest way to take advantage of this opportunity.

Above: A typical mixing plant

Below: Delivering stabilized mix on roadway

CALCIUM CHLORIDE ASSOCIATION

The Columbia Alkali Corporation • Barberton, Ohio
The Dow Chemical Company • Midland, Michigan
Michigan Alkali Co. • 60 E. 42nd St., New York City
Solvay Sales Corp. • 40 Rector St., New York City

CALCIUM CHLORIDE

FOR STABILIZING ROAD SURFACES

"I SWITCHED TO NITRAMON* BECAUSE..."

"IT IS SAFER and QUICKER TO LOAD"

"IT COSTS LESS PER TON MOVED!"

"IT GIVES BETTER FRAGMENTATION"

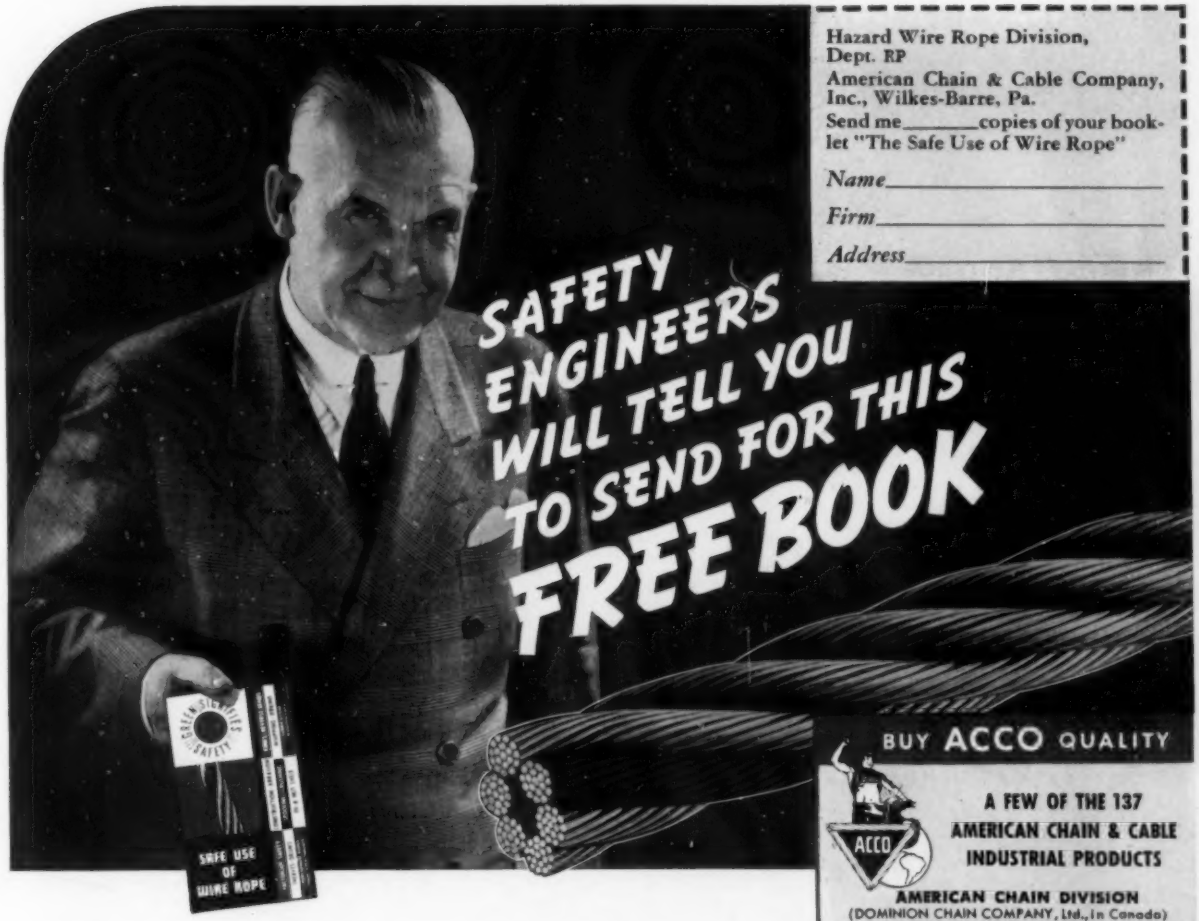
A large part of the steady increase in NITRAMON* sales comes from satisfied customers' repeat orders.

DU PONT
REG. U. S. PAT. OFF.

*Registered

E. I. DU PONT DE NEMOURS & CO., INC., EXPLOSIVES DEPARTMENT, WILMINGTON, DELAWARE

NITRAMON
REG. U. S. PAT. OFF.
THE APPROVED BLASTING MATERIAL



Hazard Wire Rope Division,
Dept. RP
American Chain & Cable Company,
Inc., Wilkes-Barre, Pa.
Send me_____copies of your booklet "The Safe Use of Wire Rope"

*Name*_____

*Firm*_____

*Address*_____

● Every safety engineer will wish that every man concerned with wire rope had a copy of this new booklet: "The Safe Use of Wire Rope."

It is a little booklet (pocket-size) but it is filled with facts of mighty importance to the man who handles wire rope. Send for your copy today. Or better still—send for enough copies to pass around to *all* your wire rope men. They are free.

Remember: this booklet was written by the men who steadfastly adhere to their oldest tradition: "In Business for Your Safety."

HAZARD WIRE ROPE DIVISION

Established 1846

AMERICAN CHAIN & CABLE COMPANY, Inc.

WILKES-BARRE, PENNSYLVANIA

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

GREEN SIGNIFIES SAFETY

BUY ACCO QUALITY

ACCO

A FEW OF THE 137 AMERICAN CHAIN & CABLE INDUSTRIAL PRODUCTS

AMERICAN CHAIN DIVISION
(DOMINION CHAIN COMPANY, Ltd., in Canada)
Weed Tire Chains • Welded and Weldless Chain • Malleable Castings
Acco-Morrow Lubricators

ANDREW C. CAMPBELL DIVISION
Abrasive Cutting Machines • Floformers
Special Machinery • Nibbling Machines

FORD CHAIN BLOCK DIVISION
Chain Hoists • Trolleys

HAZARD WIRE ROPE DIVISION
Lay-Set Preformed Wire Rope • "Korodless" Wire Rope • Preformed Spring-Lay Wire Rope • Guard Rail Cable

HIGHLAND IRON & STEEL DIVISION
Wrought Iron Bars and Shapes

MANLEY MANUFACTURING DIVISION
Automotive Service Station Equipment

OWEN SILENT SPRING COMPANY, Inc.
Owen Cushion and Mattress Spring Centers

PAGE STEEL AND WIRE DIVISION
Page Fence • Wire and Rod Products
Traffic Tape • Welding Wire

READING-PRATT & CADY DIVISION
Valves • Electric Steel Fittings

READING STEEL CASTING DIVISION
Electric Steel Castings, Rough or Machined Railroad Specialties

WRIGHT MANUFACTURING DIVISION
Chain Hoists • Electric Hoists and Cranes

In Business for Your Safety

LAY-SET *Preformed* WIRE ROPE

✳ ALL HAZARD WIRE ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE GREEN STRAND